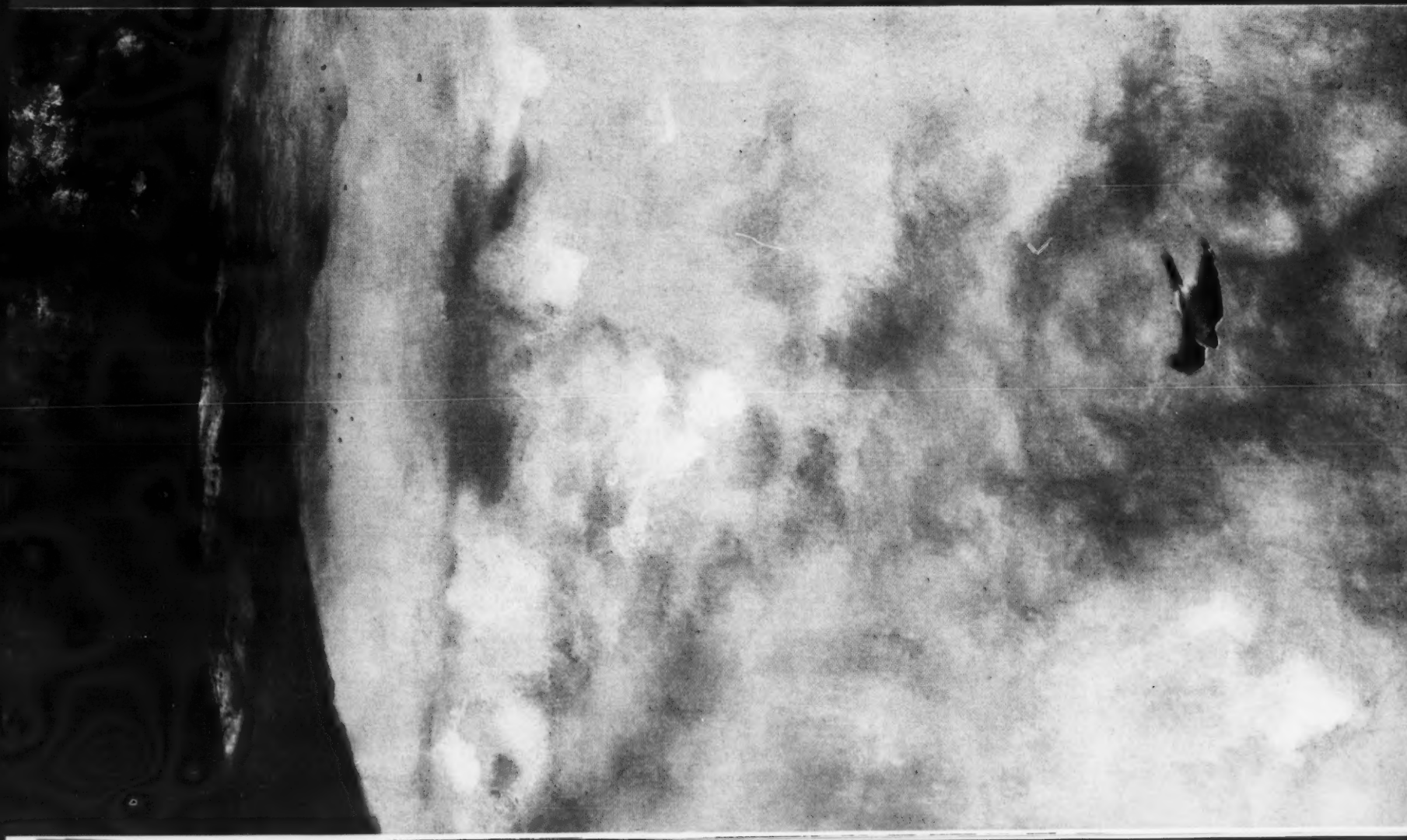
THE CONSERVATIONIST

State of New York Conservation Department October - November 1960



The 75th Anniversary

Three-quarters of a century ago, the people of the State of New York supported their Legislature and their Governor in what must be recorded as one of the outstanding victories for conservation in this country—establishment, under the laws of 1885, of the 715,000-acre Adirondack and Catskill Mountains Forest Preserve.

Thus, in a dramatic and pioneering act, the people were roused at last to bring to a halt the ruthless exploitation of our once magnificent timber resources. Ten years later, reinforcing the mantle of protection to forests and mountain watersheds, the Constitution of the State was amended (now Article XIV, Section 1) to provide that the Forest Preserve lands ". . . now owned or hereafter acquired . . . shall be kept forever as wild forest lands . . . nor shall the timber thereon be sold, removed or destroyed."

We may suppose at that point that the conservationists who had waged the long hard battle to save the remnants of our forest resources, the legislators, and the people of the State settled back to rejoice in the victory of their cause—and well they might! We do *not* suppose, however, that these pioneers, demonstrably farseeing, imagined for one minute that theirs was the ultimate wisdom to fit *all* circumstances, and *all* eventualities for *all* time. On the contrary, we are confident that were these leaders of yesterday here now they would join our generation in the carefully considered analysis of how this great natural resource heritage (now grown to more than three times its original size) can—adequately safeguarded—best serve the needs of our people today.

But these are *our* times and *our* responsibility. Reflecting that, THE CONSERVATIONIST, nearly ten years ago accepted the challenge to review editorially and in a thought-provoking series of articles, the status of our Forest Preserve in relation to the needs of our day. At the same time, the Joint Legislative Committee on Natural Resources, emulating the legislative study procedure which 75 years ago was instrumental in establishment of the Forest Preserve, began a painstaking study of this resource in the light of modern day circumstances and needs. We are proud in this issue of THE CONSERVATIONIST to present a progress report of that Committee's study by its Chairman, the Honorable Robert Watson Pomeroy. Noting the care, dedication and responsible thought so apparent in this report, we are encouraged to hope that our generation of the 60's may one day share a little of the credit so clearly earned by our predecessors of 1885.—Editor

THE CONSERVATIONIST

State of New York Conservation Department

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October - November 1960

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The Conservationist is an official publication of the N.Y.S. Conservation Dept., published every two months at the Department's office, State Campus, Albany, N. Y. No advertising accepted. Subscription rate $2.00 per year. Second Class postage paid at Albany, New York. Printed in U.S.A. POSTMASTER. (Re: Undeliverable Second Class Matter) Please send form 3579 to THE CONSERVATIONIST, Room 335, State Campus, Albany, N. Y.

The Bond Issue For Recreation

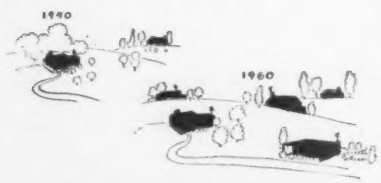
by Harold G. Wilm, Conservation Commissioner

In an article entitled "Recreation Development—Now or Never" that appeared in THE CONSERVATIONIST *for February-March, 1960, Commissioner Wilm reported on the critical shortage of our natural resources facilities for recreation. Something can be done at the polls this fall to meet this challenge. Here, in pre-election review, are the highlights of what is at stake.—Editor*

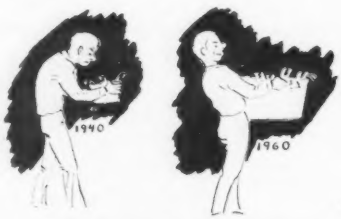
WE remember with admiration the inspired leadership of the far-seeing citizens of New York State who established the Forest Preserve 75 years ago. The creation of the Forest Preserve, in 1885, put a stop to excessive lumbering in large sections of the Adirondacks and Catskills. Slowly deserts of burned-over areas began to grow a new forest cover. Vital water-sheds gained protection. Finally, the Forest Preserve provided a great recreational area which thousands of outdoor-minded people enjoy today.

But we, too, this year—this century—have an opportunity to be remembered for an equally significant accomplishment in conservation: Approval at the polls this fall of a bond issue which will assure adequate land for the development of public outdoor recreation facilities for the generations to come.

Speaking of "generations to come," in the time it has taken you to read this far, seven persons have been added to our nation's population! In the last ten years, our population has increased 10 per cent. But that doesn't tell the real story; while that has been happening, participation in outdoor recreation has increased 200 per cent!



Outdoor recreation is keyed to modern living. Recreation is becoming more and more of a family activity. And there are more families than at any time in history. Moreover, families are bigger. Families have more time and money to spend on recreation. That's why recreation is a $2 billion business in the Empire State. That's why the demand for recreational facilities exceeds the supply.



Parks and Campsites

As Robert Moses, Chairman of the State Council of Parks, has pointed out on many occasions, park lands are in critically short supply in urban and suburban regions where open lands are fast disappearing. Last year, attendance at State parks was 31,000,000; in 1945, it was 10,000,000. But we feel the pinch in more remote places, too. At our State campsites in the Forest Preserve, we had to turn away more than 100,000 persons last year. This really hurt because the Conservation Department's job is to take care of these people, not turn them away.

New York State's recreational facilities are so inviting that they not only attract our own 16,500,000 people (with another 4,300,000 to come by 1976) but thousands from other regions too. Nearly one-fifth of the total population of both the United States and Canada is little more than half a day's drive from our State parks and our great natural playgrounds—the Adirondacks and the Catskills!

No wonder New York State's recreational facilities are straining at the seams. Despite our early pioneering in creating a unique system of State parks —a system second to none—and extensive recreational areas in the Forest Preserve; despite the fact that we have 800 miles of public fishing streams and over 500,000 acres of upland areas planned for multiple use; despite our 38 public campsites which provided 2,611,170 days of use last year; and despite such superb winter sport installations as Whiteface and Belleayre, we have to face the undeniable fact that we are short of almost every kind of public outdoor recreational facility.

Shortly after he came into office, Governor Rockefeller asked Mr. Moses and me to make a comprehensive survey of the State's future recreational needs.

The major purpose of the survey was to determine these needs, to assess the existing potential and predictable future needs of outdoor-minded citizens.

The survey was completed in a remarkably short time because the Conservation Department is essentially a field organization with a fine force of veterans. Our regional park managers, district foresters, district fish and game managers know their territories from years of experience. But they were asked to take a new and searching look which would project the recreation outlook beyond the usual stereotype year-to-year planning.

Buy Now! — or Never

The most important single finding of the survey was the immediate and compelling need to acquire additional lands while these lands are still available. Suitable sites are disappearing at an alarming rate and the prices of available sites continue to soar. With the basic information sharply underlined by the survey, my staff and I appraised the situation in terms of administrative action.

The essential first step is to acquire suitable lands before they are lost to the people of New York State forever.

Then, without delay, specific plans must be prepared for the development of these lands.

Finally, the actual construction work should proceed as rapidly as possible.

First things should come first: Land suitable for recreational development must be acquired. "There is no cheap, easy solution," Mr. Moses points out. "Moreover, there is no precedent for a program of such magnitude. The cost and the speed required to move ahead are such that ordinary annual appropriations cannot possibly do the job at any level of government, State or local."

A bold new approach is needed; $75,000,000 must be raised and the funds made available for immediate use.

A bond issue is the only practical way to do the job.

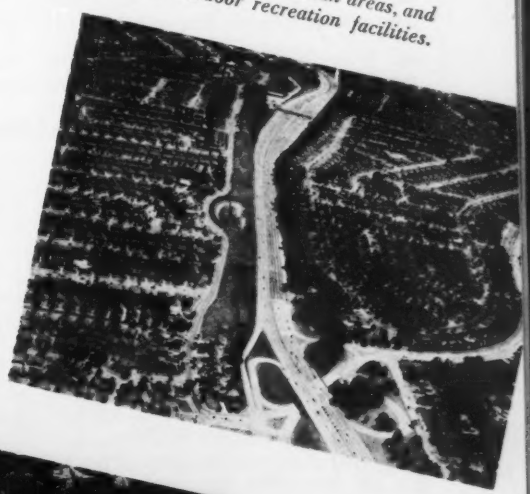
(Continued on page 4)

Exodus from the city. Any summer afternoon finds carloads of people fleeing the city in search of breathing space and outdoor recreational opportunity.

"Simply stated, our people need more outdoor living space—and wise, far-sighted provisions must be made for it.

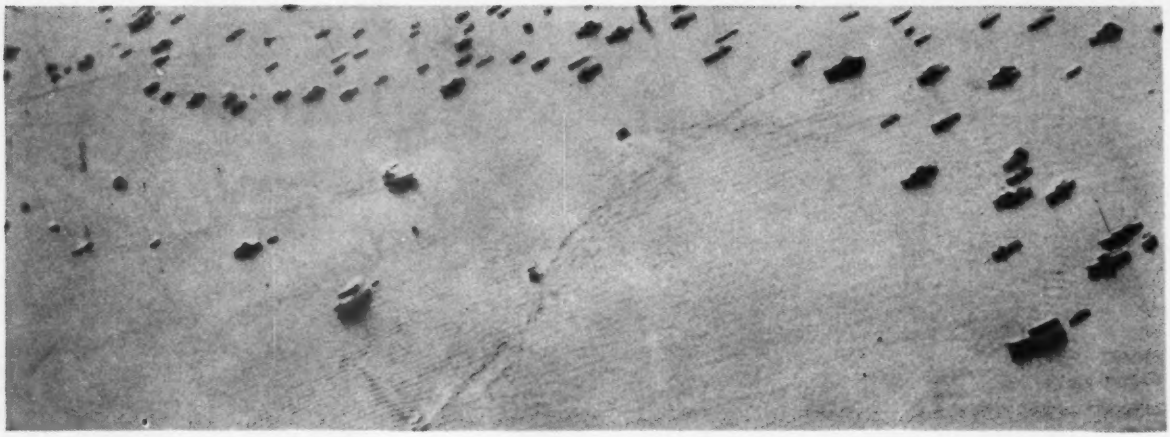
"In our own lifetime we have seen lands and waters around our cities engulfed by construction and pre-empted for outdoor recreation at an astonishing rate. Many areas which should have been reserved for public parks and recreation are already gone forever. Only a bold stroke and a major investment can save some of the remaining lands and waters."

Nelson A. Rockefeller



Valley Stream, Long Island—1933 (above) vs 1959 (below)—dramatic evidence of the surge of population, loss of open lands near metropolitan areas, and the pressing need for outdoor recreation facilities.

Public campsites provided more than two and a half million days of use last year, yet thousands of people were turned away by no vacancy signs.



Boating boom demands stepped-up program to provide access to waters and construction of launching sites

This recommendation was presented to the 1960 Legislature. The Legislature, by an overwhelming majority, passed a bill authorizing a proposition for a bond issue of $75,000,000 to be voted on by the people at the next general election—this November.

It is important to know that all of the money that would be provided in this manner would be used for acquisition of land only, not for development of facilities. Development work will be carried on later through annual budgetary appropriations. Moreover, the bonds representing the debt are to be amortized from annual revenues derived from State parks and other State recreational facilities. The $75,00,000 bond issue will be on the voting machines on November 8 as Proposition No. 1.

The policy of setting aside lands like the Forest Preserve for the future was poineered by New York State. This leadership has influenced policy at both the national and state levels. Thus, New York is again leading the way in proposing an action program to meet a problem which is nationwide. The decision we make on Election Day will be watched closely all over the country.

Because the new program, which the bond issue realistically provides, will play such a significant part in our lives and the lives of the generations to follow, I urge every conservationist, every citizen, every voter to support Proposition No. 1 with the same vigor and spirit you have supported other important conservation measures over the years.

How Recreation Bond Money Would Be Spent

(From Section 879, Part I, Chapter 523, Conservation Law)

"... The moneys received by the state from the sale of bonds sold pursuant to the park and recreation land acquisition bond act shall be expended for the following purposes in the following amounts:

(a) For the acquisition of lands for state park purposes, twenty million dollars ($20,000,000);

(b) For the acquisition of lands for other than state park or municipal park purposes, to provide additional opportunities for outdoor recreation, including public camping, fishing, hunting, boating, winter sports, and, wherever possible, to also serve multiple purposes involving the conservation and development of natural resources, including the preservation of scenic areas, watershed protection, forestry and reforestation, fifteen million dollars ($15,000,000);

(c) For state aid in the amount of seventy-five per cent of the cost of acquisition of land for parks by cities other than the city of New York, or by improvement districts within cities other than the city of New York, twelve million dollars ($12,000,000);

(d) For state aid in the amount of seventy-five per cent of the cost of acquisition of land for parks by the city of New York, or by improvement districts therein, twelve million dollars ($12,000,000);

(e) For state aid in the amount of seventy-five per cent of the cost of acquisition of land for parks by counties, towns and villages, or by improvement districts therein, sixteen million dollars ($16,000,000).

The Proposition

This is how Proposition No. 1 (the Recreation Bond Issue) will read—look for it on November 8 when you go to the polls:

"Shall chapter 522 of the laws of nineteen hundred sixty, entitled 'An act authorizing the creation of a state debt to the amount of seventy-five million dollars to provide moneys to acquire predominantly open or natural lands for conservation and outdoor recreation, particularly in and near rapidly growing urban and suburban areas to meet future recreation needs of an expanding population, to acquire additional state park lands, to provide for state grants to municipalities in acquiring similar lands for municipal parks and to match federal funds which may from time to time be made available by congress for such purposes, and providing for the submission to the people of a proposition or question therefor to be voted upon at the general election to be held in November, nineteen hundred sixty' be approved?"

Wilderness in the Forest Preserve

— A Heritage to be Guarded

by Robert Watson Pomeroy, Chairman, Joint Legislative Committee on Natural Resources

IN the Adirondacks and Catskill mountains, far from the drone of traffic and the smoke of town and factories, lie vast areas of peace and quiet. These tracts are part of the State's great Forest Preserve, a priceless heritage which has now grown to more than 2½ million acres. We, the people of New York State, own this magnificent resource and each and every one of us has the right to seek there recreation, health and the peace of mind inherent in the solitude and beauty of a wilderness.

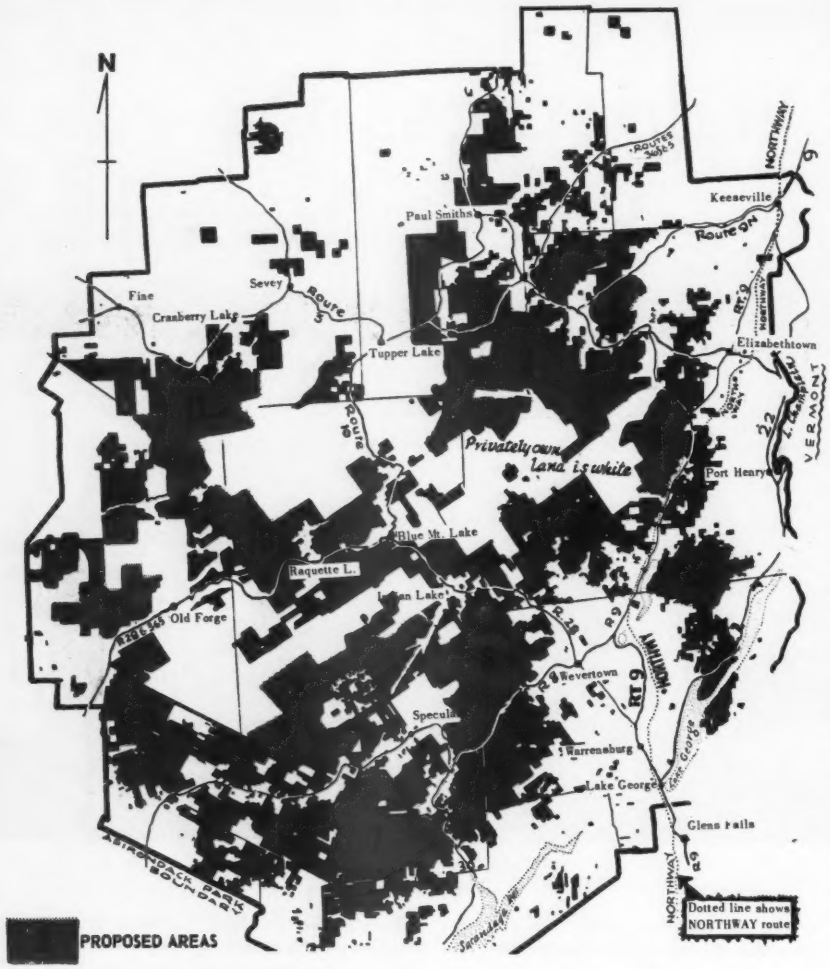
This Forest Preserve, set up by the Legislature 75 years ago, did not just happen by accident. It culminated years of bitter controversy waged to preserve what then remained of the State's once great forests and to protect its watersheds. In the years immediately following, the people of the State determined that they would take this power of protection into their own hands and adopted, in 1894, the constitutional amendment which reads as follows: "The lands of the State, now owned or hereafter acquired constituting the forest preserve as now fixed by law, shall be kept forever as wild forest land. They shall not be leased, sold or exchanged, or be taken by any corporation, public or private, nor shall the timber thereon be sold, removed or destroyed."

Seventy-five years ago the newly-created Forest Preserve amounted to less than 800,000 acres. Much of it was land which had already been cut or burned over. Establishment of the Preserve did help to protect the watersheds and to save a fraction of our primeval forests, but the people who used it in those days for health and recreation were a mere handful. Transportation was primitive, for the most part, and roads almost impassable. Those few who could afford to vacation in the Preserve, often spending the whole season there, frequently traveled by train and put up at the plush (at that time) summer hotels. Even as late as 1908 we find in a Forest Commission report the remark: "As a whole, people are not using our Preserve at all. Comparatively few people, under present conditions, can afford to use them."

In the early days and during the years which followed, the protection and prohibitions which had been written into the Constitution served the use and administration of the Preserve very well. Use of the Preserve gradually increased, but as it did the land holdings of the State were also greatly enlarged. In special cases, where there was sufficient popular demand, new amendments were adopted. Construction of municipal water supplies, rebuilding of existing State highways to modern standards of safety, provisions for the rapidly growing recreation of skiing by development of trails on Whiteface, Belleayre and Gore mountains and a few other constructive changes were permitted under careful restrictions.

In recent years, however, new pressures have been brought to bear upon the Forest Preserve. Where once only the fortunate few could avail themselves of its benefits of the Forest Preserve, now millions come—by air, by bus and by streams of sleek cars over modern high speed highways. They come with more time to spend, more money to spend and more interest than ever before in the outdoor life. The Forest Preserve is no longer just a summer playground for a relatively few well-to-do; as its fame has spread it has come to be enjoyed by people in all walks of life from all over the United States, Canada and other parts of the world. Millions are driving

LOCATION OF PROPOSED ADIRONDACK WILDERNESS AREAS



THE ADIRONDACK PARK, ABOUT HALF OF WHICH IS PRIVATELY OWNED (WHITE PART). THE BLACK PART IS STATE FOREST PRESERVE LAND.

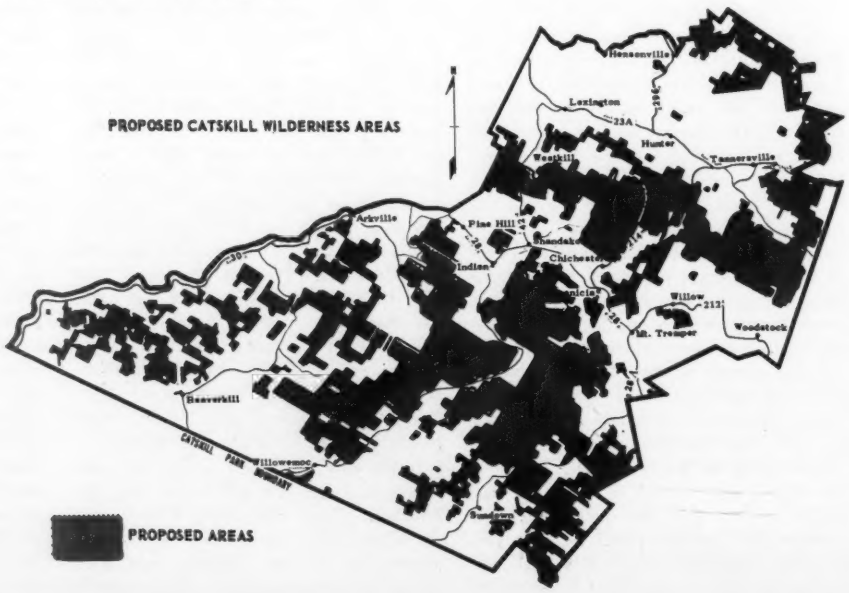
through it each year, with hundreds of thousands vacationing at the public campsites—362,000 in 1959 for a total of more than a million and a half camper days—with hundreds of thousands more staying in privately-run hotels and motels scattered throughout the Adirondacks and Catskills. They come to hunt, to hike through the forests, to fish or boat on the waters, to picnic or swim at the beaches, to ski on the slopes in winter or just to relax and enjoy the scenery.

The changes we have described briefly have come to pass within the first 75 years of the Forest Preserve's history, most of them in the last decade or so. During the next 40 years it is estimated that use of the Preserve will increase 20 fold, and it is difficult to imagine how easily we shall then be traveling to any spot we wish.

Under the changes which time has wrought, the constitutional provisions regarding the use of the Preserve are beginning to show flaws. On the one hand, the set of rules which prescribe that the lands of the State shall be kept forever as wild forest land are being thwarted, circumvented and threatened by modes of transportation undreamed of 75 years ago, but which today permit access to the very heart of our wilderness areas. Jeeps, "doodlebugs" and a variety of unnamed contraptions, some with winches to pull themselves through particularly rough going, are taken over paths which should be prohibited to them, often churning up the footing and making hiking unattractive and difficult. In many

(Continued on page 8)

PROPOSED CATSKILL WILDERNESS AREAS



Proposed Forest Preserve Wilderness Areas

MAP NO.	WILDERNESS AREA	GENERAL LOCATION	APPROXIMATE ACREAGE	OUTSTANDING FEATURES	RECREATIONAL OPPORTUNITIES
			ADIRONDACK REGION		
1.	McKenzie Mountain	Northeast of Saranac Lake	34,000	Rugged mountains; dense forests; peaks of Moose, Haystack and McKenzie	Hunting, fishing, camping, mountain climbing, hiking, nature study
2.	Sentinel Range	East of Lake Placid	20,000	Rocky slopes, rugged peaks, including Kilburn Mountain	Hunting, fishing, hiking, mountain climbing, picture taking
3.	High Peaks	South of Saranac Lake and Lake Placid	165,000	Network of hiking trails, many open camps, mountain scenery, breathtaking views, high peaks, waterfalls, pretty lakes and streams, alpine vegetation	Hiking, mountain climbing, picture taking, hunting, fishing, camping, and for nature study, geological exploration, canoeing, swimming
4.	Mt. Dix	South of Chapel Pond	43,300	Mountain scenery, rocky terrain, waterfalls	Mountain climbing, hiking, picture taking, hunting, geological exploration
5.	Pharoah Lake	East of Schroon Lake	47,000	Beautiful, crystal-clear lakes and ponds, delightful camping spots, outstanding fishing waters	Camping, canoeing, fishing, hunting, hiking, swimming
6.	Siamese Ponds	East of Indian Lake	100,000	Spectacular forests, prime hunting and fishing, beautiful lakes and streams, ice caves	Hiking, fishing, camping, hunting, nature study, mountain climbing, swimming
7.	Silver Lake	Southeast of Piseco Lake	110,300	Large timber, rolling terrain, attractive streams, crystal lakes	Hiking, hunting, fishing, nature study, swimming
8.	West Canada Lake	West of Piseco Lake	110,000	Scenic lakes, excellent big game habitat, softwood flats, old logging dams	Fishing, hunting, hiking, camping, boating, canoeing, nature study, swimming
9.	Big Otter Lake	Northwest of Fulton Chain of Lakes	27,000	Rolling terrain, extensive light stands of timber	Hunting, fishing, camping, boating, canoeing
10.	Pigeon Lake	Between Raquette Lake and Stillwater Reservoir	38,600	Giant white pines, superb red spruce and yellow birch, excellent trout waters	Hunting, fishing, nature study, camping, swimming
11.	Five Ponds	Between Cranberry Lake and Stillwater Reservoir	68,600	Mammoth white pines, virgin softwoods, eskers, extensive zones of flat and swampy lands	Fishing, hunting, camping
			CATSKILL REGION		
12.	Slide Mountain-Panther Mountain	West of Ashokan Reservoir	40,600	Mountain peaks, steep slopes, talus slides, hiking trails, excellent vistas	Hiking, mountain climbing, hunting, picture taking
13.	Doubletop-Big Indian Mountain	West of Big Indian-Frost Valley Road	20,300	Superb hardwood forests (black cherry and white ash), rolling terrain, abundant game	Hunting, fishing, camping, hiking
14.	Plateau-Indian Head Mountain	East of Hunter-Phoenicia Road	15,700	Excellent vistas, barren talus slopes, dense spruce-fir forests	Hiking, hunting, mountain climbing, picture taking
15.	North Dome-Westkill Mountain	South of Westkill-Sprucetown Road	14,400	Large red spruce trees, rock outcroppings and ledges, steep terrain	Hunting, mountain climbing

(Continued from page 6)

instances they break out new roadways through the woods. Small 'planes now land on many of even small wilderness lakes and, with further development of the helicopter, there will be practically no opening in the forests inaccessible from the air. The use of outboard motors and houseboats often pollutes the waters and the sounds of these motors can ruin the peace and quiet which is a quality essential to wilderness.

On the other hand, the constitutional limitations, if taken literally, are not flexible enough to permit our citizens—millions now, where there were mere hundreds or thousands before—to secure the outdoor benefits they so eagerly seek and which our Constitution intends to provide. For instance, it has never been definitely ascertained by court procedure whether the construction of our very popular public campsites (which provided vacations for 362,000 people in 1959) is authorized or prohibited by the Constitution.

Just as there was controversy 75 and 80 years ago regarding the setting up of the Forest Preserve, so there has always been disagreement over its use and management. Bitter fights were waged over all the amendments mentioned above and other amendments which failed to pass, as well. For more than a decade, articles and editorials have appeared in this and other publications urging further thought and changes beyond those which already have taken place or making pleas for the status quo. So it was in line with its responsibilities to the people that the Legislature recently decided to study the problems involved and seek a better solution.

The Joint Legislative Committee on Natural Resources, created by the Senate and Assembly in 1951 and continued each year to date, was directed, among its other duties, to make these studies. The Committee is composed of members of the Legislature appointed by the leaders of the two Houses and of State officials appointed by the Governor. It has, in addition, the help and guidance of an advisory committee appointed by the chairman. The members of the advisory committee are selected to give representation to various important groups whose interests lie in the Adirondack and Catskill regions.

During the years 1952-1958, Senator Wheeler Milmoe skillfully guided the Committee in the accumulation of much valuable information concerning the Forest Preserve, as well as sponsoring successfully legislation and constitutional amendments to improve its management, protection and use. In 1959, when I was appointed Chairman, the Committee decided to attempt the development of an overall, long-range plan for the Forest Preserve. This plan would be designed not only to help solve some of the problems of the present but to look, as well, to the future and seek to provide for the best and fairest use of the Preserve by all for generations to come.

As a first step in this program, we determined to make, in co-operation with the Conservation Department, a detailed study of certain parts of the Preserve which appeared to constitute at present true wilderness areas. We wished to ascertain what added protection from improper and non-wilderness type use is needed and what additional lands, now privately-owned, should be acquired to keep these areas wilderness in proper sense of the word. In launching this study, we were cognizant of the changes that have occurred in our times, and which today do threaten the wilderness characteristics of the Preserve. We recognized that wherever true wilderness still exists within our Preserve, even more stringent protective measures would be needed than are afforded now under the blanket, forever-wild provisions of the constitution.

At the same time, we were well aware that the Forest Preserve is not a solid block of State-owned, forest land. Rather, it is a patchwork ownership pattern, made up of State-owned tracts, both large and small, interspersed and sometimes completely surrounded by privately-owned lands. Moreover, as everyone knows who has traveled in the Adirondacks and Catskills, there are not only thriving towns and villages, but also commercial enterprises of all sorts on privately-owned lands, catering to the tourists. These facilities fill a need and are attractive to many people, but it is not possible for them and true wilderness to exist side by side. At the same time, the public is denied access to wilderness areas in some regions. This must be remedied by appropriate means.

Accepting these conditions as realities, our Committee set up preliminary standards for wilderness areas and sent a field team into the Adirondacks to begin an on-the-ground survey. The team was composed of Neil J. Stout, Executive Director of the Natural Resources Committee and former Research Associate at the College of Forestry in Syracuse, and Clarence A. Petty, graduate of the Syracuse College of Forestry, and a member of the Conservation Department. Both of these men are, in addition to their training as forestry experts, well acquainted with the Adirondacks—Mr. Petty as a life-long resident, and Mr. Stout, who was headquartered there by the College of Forestry for several years.

The standards for wilderness areas which the Committee decided upon were: Minimum area of 10,000 acres with no habitations nor public or private roads. Moreover, such areas should have certain requirements associated with true wilderness such as: Lying beyond the sights, sounds and odors of civilization: with views or scenes of unusual interest: the power to instill a feeling of adventure; where full enjoyment depends upon a person's own requisites.

In 1960, the field team was supplemented by two additional foresters who were acquainted with the areas and the survey was carried on in both the Adirondacks and Catskills. During both of these years, I frequently joined the field teams in their on-the-ground studies.

With this predetermined set of standards in mind, and from the information gathered during two years of intensive field study, the regions which appear to meet the qualifications and to offer the best opportunities for true wilderness areas are shown on maps and table, pgs. 6, 7.

The wilderness areas selected comprise approximately one-third of the Forest Preserve. They, alone, possess the *size* required for a wilderness classification. The Committee is now in the process of evaluating the results of the two years of field studies. As our plan for these areas develop and the steps necessary for their protection and improvement are determined we shall make recommendations for their adoption and fulfillment. In some cases it may already be within the power of the Conservation Department to carry out the recommendations by directives. In other cases where legislation may be needed, that will be our responsibility.

After the wilderness areas are set up and provided for, the Committee will continue its long-range planning for the other parts of the Forest Preserve. Some of these may have unusual qualifications of beauty or interest which will warrant special protection and classification of their own, such as "wild areas." Other parts, readily accessible to existing highways, are suited for development of additional public campsites, picnic areas and other concentrated recreations.

In all of our studies and actions the Committee will continue to make every effort to keep the people of the State informed of our progress. We are confident that by continuing to work closely with the Conservation Department and with the help of an interested and informed public, we can plan for our great Forest Preserve to be enjoyed and shared by an ever greater number of people. At the same time, we can safeguard the wilderness heritage entrusted to us.

Ward's
— Crossroads of Natural Sciences

A Century Tour From Curio Shop To Renowned Biological Supply House

by H. Wayne Trimm

FROM Europe, Africa, Asia, the Americas, Australia, the Arctic, the tropics—from below the surface of soils and oceans, and from outer space, natural science materials of intriguing variety come to a small but well known concern in Rochester—Ward's Natural Science Establishment. Founded in 1862 by Henry A. Ward, whose first transaction was the sale of a mineral collection to what is now Vassar College, Ward's has grown into one of the world's leading suppliers of biological and natural science materials.

In its earliest days the establishment handled all sorts of biological oddities; came to be thought of as a natural science curio shop. Stuffed rhinos, mastodon bones, fossil dinosaurs, snake bones, human skeletons, miscellaneous stuffed birds and deer heads were in regular supply. The business in the early years was primarily that of supplying museums with unusual display specimens. Or, if the services of a museum preparator or taxidermist were needed to set up some strange creature for display, Ward's was ready to oblige. For example, when Jumbo, the famous circus elephant was killed by a train about 1870, Ward's was given the job of stuffing the giant. By modern standards and methods it was a pretty crude piece of work but in those days it was impressive and was viewed with much interest and respect. The mount went to Tufts College and the skeleton to the American Museum of Natural History, New York City.

In spite of the diversity of oddments, the emphasis at Ward's was on the geological and paleontological aspects of natural sciences, reflecting the original interests of the founder. For many years the establishment did very well, since the public was curious about the natural sciences in other parts of the world. Museums were popular and business was good. But a change was taking place. The world was getting smaller. People found they could travel to strange places and see strange and wonderful things, firsthand. Steamships, automobiles, and airplanes all contributed to shrinking distances. At first this increase in travel stimulated interest in the bizarre natural aspects of the world and opened up new sources of material but gradually a more realistic appreciation of the natural world developed. People no longer flocked to look at some preserved oddity in a dusty museum. Public educational displays and classroom sciences began to grow in popularity; people became more curious about what made things "tick."

Ward's was not then geared to the changing trend and by the 1920's the establishment was in financial difficulty. At this point, the University of Rochester took it over, operating it as a non-profit enterprise until 1933. In that year, a one-time employee of another biological supply house and a university professor, Dr. D. L. Gamble, organized a small group of stockholders to take over and once again operate Ward's as a private enterprise.

Today, Ward's employs about 70 persons at its Rochester plant. It functions in three basic units: Biology, Geology and Paleontology, and Equipment. In addition to the Rochester plant, Ward's operates a fishing station in Maine where thousands of dogfish (a small shark, used widely as a teaching item) are captured and preserved. There is also a new branch of Ward's at Monterey, California, established to supply the western states.

Under this setup, with professionally trained personnel in charge, Ward's has become a modern, efficient biological supply center. As noted above, in the early days the bulk of business was with museums but the emphasis is now on supplying colleges and high schools with teaching materials and providing equip-

The crew at Ward's in the curio shop days

The "bone department" where skeletons are cleaned and assembled

ment for individual hobbyists.

A continuing, and profitable interest at Ward's is the development of teaching materials and techniques. They have some unique ones to their credit. One of the best known is the Mueller-Ward series of an atomical and zoological models. These are enlarged scale models of the anatomy of representative animals or their parts such as individual cells, brains, cell structures, and the like. All have been carefully researched and sculptured by Dr. Justus F. Mueller of the Syracuse Medical School. Models are reproduced in plaster and beautifully hand painted. Biology students throughout the world have used these graphic aids.

Another Ward's "first" was launched in 1946—a method of preserving small, soft and delicate specimens by imbedding them in clear bioplastic. Fragile skeletons of bats and snakes, transparent jellyfish, and thin-winged insects are a few of the items so treated. Results with bioplastic are somewhat similar to natural amber imbedded insects and plants. Several million years ago plant and animal material sometimes became trapped inside globs of resinous plant juices. These hardened and later became fossilized. At Ward's, simulating this process, the imbedding is done with specially prepared specimens arranged in a large, thick sheet of plastic. When hardened, it is sawed into individual blocks and polished. Thus prepared, specimens are available for study, yet safe to handle. Not all such material is sold for teaching. Hobbyists buy many items, of which the diminutive sea horse is most popular for ornaments.

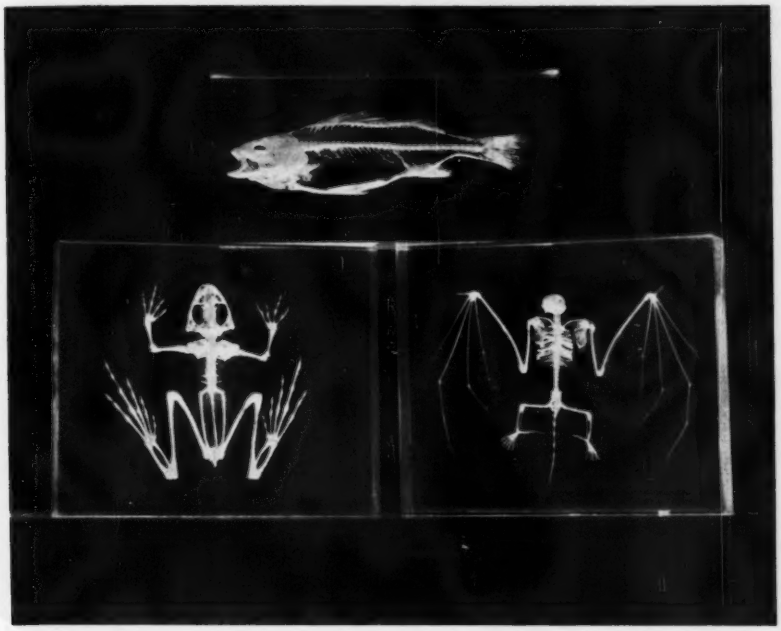
Today the atmosphere at Ward's is quite different from the early "curio shop" years. It is unusual for anything very exotic in the biological line to show up. The days of elephant stuffing are gone, giving way to emphasis on specimens and materials which have greater application in teaching. To procure these specimens, Ward's is in constant contact with field collectors in all parts of the world. A list of needed specimens is available upon request from Ward's.

The geology-paleontology department is supplied from nearly every continent as well as from outer space. Rocks and minerals of all sorts—shales from Tasmania, schists from South Dakota, syenite from Norway, marble from Massachusetts, limestone and garnets from New York, obsidian from Oregon, diamonds from Africa, wood opal from Nevada and meteorites from outer space —are a few examples. From these and hundreds of other sources, great quantities of rough rocks and minerals are broken into smaller samples that can be used by schools and hobbyists in studying earth formations. Before shipping, each small particle is carefully washed and labeled for positive identification. Kits of various rock samples with descriptive texts are often compiled. These have proved to be popular items and are ideal for the beginning student.

Black light kits are an interesting and popular specialty developed; the light

used to reflect brilliant and characteristic colors of certain minerals. This has created a business in itself. Black light kits have continued to gain in popularity even when standard items have not been selling well. Some of today's prospecting is done with the use of these black lights.

Another and fascinating part of the geology division is the paleontological section. New York State is one of the best sources in the world for certain animal fossils such as species of brachiopod found as fossils in rocks. Judging from the numbers preserved, bottoms of early seas must have been covered with these tiny animals. Trilobites, looking a bit like minute marine armadillos, were common also. It is impossible to review all that is represented in the fossils at Ward's, but much of the life history of this old globe is on record here and available in kits and special collections.



Bioplastic imbedding is ideal for delicate skeletons such as fish, frog, bat, shown here

Seahorse imbedded in bioplastic—a popular item

Fundamental to the structure of many species of animals is the skeleton or boney support. If you are looking for complete sets of representative skeletons from the primitive fishes to the human, Ward's has them all. India is the source of most human skeletal material but other forms are collected locally.

While the skeleton is basic to support, cells and tissues are the building blocks of the body. To see these, tissue must be cut, stained and prepared on microscopic slides for viewing under very high magnification. This is a job at which women seem to excel, and they are so employed at Ward's. Painstaking exactness of handling minute pieces of tissue calls for tremendous patience and steadiness of hand. Results are worth the effort.

Microscopic slides are not the only type furnished by Ward's. Available also are color slides of plants and animal life, taken by some of the leading photographers of the country. For example, there are the tree slides done by Dr. William Harlow of the Forestry College at Syracuse, recipient of many photography awards.

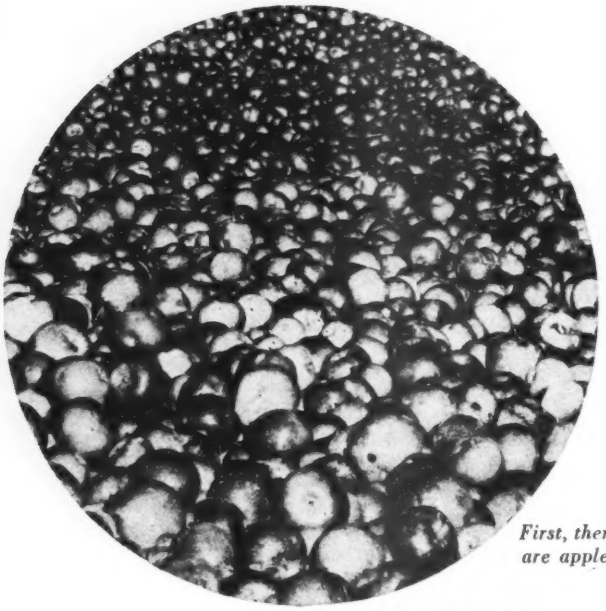
Almost any field of activity involves use of equipment. Available at Ward's are microscopes, field collecting equipment, storage cases and cabinets.

Another activity started just this year is a teachers' workshop, organized to help bring teachers up to date on current equipment as well as to give them a chance to consult with specialists in varying fields of natural science. Response to the workshop has been favorable and it is hoped that the program will continue succesfully.

Ward's is rightfully proud of the role they have played in the training of naturalists and conservationists throughout the world. Originally stimulated through museums, later by classroom and hobby aids, many have found new enthusiasm for natural science through the products of this establishment. A great deal of Ward's material is sent overseas to new universities and educational institutions now being developed. Perhaps some of the students will share the same thrill I felt when I realized that here was a focal point of great ages and dramas of nature. Here I could visualize stories of ancient seas and of modern biology, progress and technology all concentrated under one roof. For each rock and fossil, each dogfish and jellyfish represented a period of creation and adventure.

Apple Cider

by Nick Drahos



First, there are apples

FALL in America means many things—the end of trout and baseball seasons, the World Series, football, "mums," fall color, Indian Summer, hunting seasons, and clambakes—to mention a few. Most of all, for man and wildlife, fall means harvest time. And in the "apple belt" of America, harvest time is apple cider time.

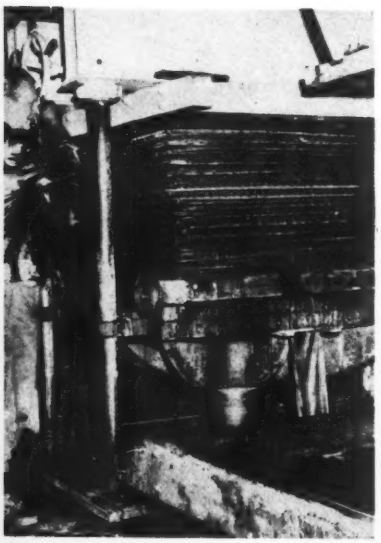
Spontaneously, it seems, cold frosty glasses of sweet cider appear at carnivals, picnics, horse races, bazaars and barn dances all over America. Time was when apple cider was sold fresh off the press with that "kiss of the crop" flavor. Now, sad to say, too few cider guzzlers get the real old-fashioned fresh apple juice unless they live near a handy cider mill. Of course, as good as canned apple juice is, it doesn't hold a candle to fresh cider; that fresh flavor is gone. And gone, too, are the days when sweet cider, along with pink lemonade, were *the* drinks at state and county fairs. Now, "soda pop" rules the roost.

Today, if you are traveling through apple country in the fall, you may be fortunate in finding a going cider mill with fresh cider for sale, but most of America's cider ends up benzoated, filtrated or in cans as a pasteurized breakfast drink. Recently the New York State Agricultural Experiment Station at Geneva developed a new type "natural" apple juice by adding ascorbic acid (vitamin C) to the apples as they are ground. This makes apple cider a more nutritional drink than even the natural juice.

Most of the sweet cider pressed in this country winds up as cider vinegar, lending a distinctive bouquet to the culinary efforts of the American house wife. And on the sunnier side, cider vinegar is, oddly enough, still one of the best suntan lotions for milady's skin. Cheap, too.

Still, even though apple cider is not the kingpin of the soft drinks any more, I know of many a country cellar where one can find barrels of apple wine and

These are grated and spread for pressing



Then they are pressed; 30 to 40 barrels of juice per ton of apples

Pressed remnants called apple cheese or pomace

hard cider, just waiting for an excuse and not much of a one at that, to be cracked open. Sweet cider is one thing but hard cider is a horse of another spirit. The best home brew is made by allowing a barrel of aged cider to freeze, letting the water in the juice turn to ice to leave the heart in solution—an elixir of apple flavored alcohol. Sometimes this is flavored and smoothed by the addition of honey. The end product may taste innocuous, but don't be fooled —it's not! Even wildlife appreciates the powers of the apple. Bear and deer have been known to get tipsy on apples, particularly after the fallen fruit has been touched by early frost, and I've long suspected that many of the autumn "crazy flights" of ruffed grouse are due to sweet apple toots.

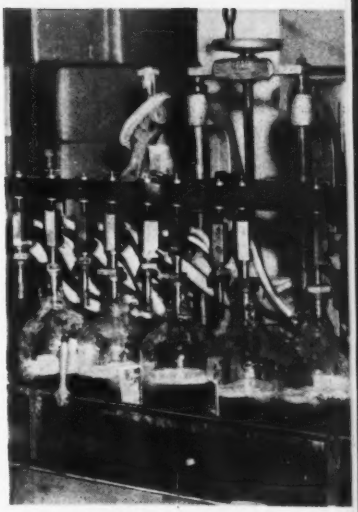
The best apple cider is made from such species as Baldwin, Northern Spy, Cortland, Rome Beauty, Golden Russet, Rhode Island Greening, Jonathan and Roxbury Russet apples. The Baldwin, as a rule, is the kingpin of cider apples. It is the basic apple and when modified and blended with the juices of Northern Spy, Cortland and Russet, you get the best flavored of any cider. On the other hand, McIntosh, Wealthy and Delicious apples alone are usually too sweet (not acid enough) and must be mixed in with the tart varieties to produce a satisfactory cider. A touch of Russet enhances the flavor of any apple juice.

The remains of the grated, pressed out apples, the pomace or "apple cheese," make an excellent supplementary cow feed, but not too many farmers know of its merits. In an experiment on beef feeding by the Virginia Agricultural Experiment Station and the USDA Beef Cattle Research Station at Front Royal, Va., unbred Shorthorn yearling heifers gained 115 pounds in 106 days on apple pomace and one pound of cotton-seed cake daily. This compared to only 32 pounds gained by other heifers on sorgo-Sudan grass-soybean silage and .75 pounds of cottonseed cake daily—a gain ratio difference of 1.09 pounds to 0.3 pounds. Pregnant cows seem to do better on apple pomace, too.

In some places, apple pomace is returned to the land as fertilizer but more often than not, it is just plain dumped. Some is used, as at the Geneva Experiment Station, in apple research: sowing the pomace to produce apple trees in hedgerows, to search for new varieties. Here's a trick wildlife managers and many sportsmen's clubs could utilize in improving game habitat on the land.

Our thanks to the Fauth's of Nassau, New York, at whose cider mill most of these pictures were taken.—Editor

Labelling one gallon cider jugs



Which are automatically filled

Right, above—apple pomace makes good cow feed

Above—some comes by the barrel

Right—and some people make their own sweet cider

Below—apple tree hedgerow grown from seed-filled pomace

Hawks Over New York

by Walter R. Spofford

Sharp-shined hawk over the Hudson Valley (see cover painting)

THE seasonal migrations of birds are among the great spectacles of nature; the great fall flights of waterfowl, the wave-like appearance of songbirds in spring and the less heralded but dramatic flights of hawks and eagles to and from their breeding and wintering grounds. Flights on a broad front often go undetected, but when the flight is concentrated, either by geographic configuration or by weather conditions, the passage makes an unrivaled spectacle.

Moreau ('53) refers to the observations of Belon, published in 1555: "We were at the end of April on the shore of the Black Sea, on the coast of Thrace, on the highest hill at the mouth of the Bosphorus, on which there was a bird-catcher who had put out his net for Sparrow hawks. . . . When we saw the Kites were coming in such great flocks that we marvelled at them. We could not imagine where such vast numbers found room to live . . . one might say they were in greater numbers than all the men living on the earth. They passed as thick as ants and continued for many days." Even though the great flights of Kites has dwindled (just during the last century) to a shadow of their former numbers, this is still one of the major hawk flyways, and Ian Nisbet watched 499 Spotted Eagles pass over the Bosphorus on 17 September, 1956.

Geographic "bottlenecks" funnel birds from vast regions through narrow corridors, and the hawks of Europe may fly westward through Spain and stream across Gibraltar into Africa for the winter, or fly southeasterly through Turkey, crossing the Bosphorus and the Dardanelles. These latter are joined by birds from western Asia from a trans-Caucasus crossing, and the resulting flight across Suez is the greatest of all. In America, Alexander Skutch has described the spring flight, from their wintering grounds in South America up through Costa Rica, of just about the total population of the Swainson's hawk of the western plains and the Broad-winged Hawk of our eastern woodlands: "Some of the flocks of Swainson's hawks are so unbelievably vast that the watcher receives the impression that practically the whole of the species must be represented in that one immense aggregation of migrating birds."

Flight Patterns in New York

Here in New York we have no such great geographic bridges as in the above accounts, but there is a great deal of funnelling along lesser ridges of the Appalachians leading toward the great flyway along the front of the Alleghanies of Pennsylvania. Hawk Mountain Sanctuary, near Hamburg, Pa., gives an unrivaled panorama of the fall passage of hawks from September on through November. Birds use the elements to fly in the most economical ways possible, and aeronautical "lift" is provided by obstructions, such as ranges of mountains where a cross wind is deflected upward, and by "thermals" rising over the warmer parts of broken country. Glider pilots do their best to ride these updrafts for sustained flights. Hawks pick up these thermals, rising to heights, and then sail down and on to the next. During the third week in September, when the Broad-wing flight comes through, thousands of birds may pass Hawk Mountain in a day, even in a matter of an hour or two. Great swarms spiral up in ascending air currents until high over the ridge, then peel off in long glides as gravity carries them gently down for mile upon mile, and renewed lift buoys them up almost continuously. Beginnings of this flight may be seen in New York, and in 1936 I watched hundreds of Broad-wings and a few Sharpshins pass along the cliffs of the Shawangunk Mountains west of Newburgh. The Hudson Highlands and Mt. Peter are also good flight points.

Water produces another type of hawk concentration and the largest flights in New York are seen in spring, when a south wind blows a flight against the shores of the Great Lakes. Birds passing on a broad front are displaced by wind, a south wind blowing the northward flight in spring along in the proper direction. But since the even temperature of water provides no thermal lift, hawks cannot fly over large bodies of water without great effort. The cold water of the Bosphorus causes a down draft of air, and eagles, so Ian Nisbet told me, starting across at high elevations sink rapidly and may be just above water top after crossing only a few miles to the opposite shore.

Falcons, which are not hawks, have long pointed wings like the Shearwater and the Albatross, and so does the Osprey, and they can fly over water more easily. Peregrine Falcons flying south from Greenland in late September and early October cross many hundreds of miles of open water, some probably reaching the Caribbean by over-water flight, without passing over land. Emperor Frederick II, in his famous falcon book, shows the picture of a falcon riding one of the great oared boats of that time, and today falcons frequently come aboard ship for a rest. But hawks and other birds of prey cannot fly "economically" over water, and pile up in great flights along the shore, given a favorable wind.

During April in New York a south wind blows the birds riding thermals along until they reach the shores of the Great Lakes, where they veer off to continue their flight over land. This can result in great concentrations of birds. Those riding up along the south side of Lake Erie may turn westward past Buffalo into Ontario, or continue in the northeasterly direction, on past Rochester and eventually pass over Selkirk Shores State Park, eastern Lake Ontario.

The Species Aloft

The species of hawks using our New York flyways vary according to season and to weather, and to the kind of flyway. The fall flight along the south shore of Long Island is mainly falcons and accipiters, but the spring flight along the south shore of Lake Ontario may tally over a dozen species, with as many as 5,000 birds having been seen in one day. The different species of hawks have been illustrated in THE CONSERVATIONIST by Wayne Trimm (August-September, October-November, 1954), and one may review these fine articles, or consult a field guide such as Peterson or Pough, for details.

In the spring flight along the south shore of Lake Ontario hundreds of Red-tails and fair numbers of Red-shoulders go over in March, and a few Goshawks also, if one is lucky enough to see one. These birds are early nesters and lead the migration. The Red-tails are mammal feeders and the Red-shoulders can live on mice, but also eat amphibians and small reptiles so need some warm weather. The Broad-wings feed on some mice but mainly on amphibians, reptiles and even insects, and their northward flight comes later, in the fourth week in April. On a warm day with a south wind the sky may fill with wheeling flocks which look astonishingly like swarms of bees. Over 4,000 Broad-wings have been seen on the "peak" day! Hundreds may preceed the big wave, and others follow it, but the "wave" has a fairly sharp crest. The Broad-wings are forest dwellers, smaller than the heavy-set Red-tails, and their major remaining breeding ground is in the woodlands of eastern Canada. Probably more Broad-wings go through New York in spring than in fall, because the birds fly north until they reach the south shore of Lake Erie, and as far west as Ohio their flight is deflected eastward until they eventually pass the eastern end of Lake Ontario. The southward flight is somewhat the reverse, only those that breed to the east of 76° pass down across New York and on through Pennsylvania. This accounts for the smaller flights seen at Hawk Mountain than at Toronto and along the north shore of Lake Erie. In September of 1955 over 20,000 Broad-wings passed over Mrs. McDougall's garden below Toronto, double the number that go over Hawk Mountain.

The most notable feat in hawk-watching I know of was performed by Dr. William Gunn of Toronto, in September, 1954. Picking up a huge flock of Broad-wings on September 23 near Rattlesnake Point, on Lake Ontario, he followed them by automobile around the Lake at Hamilton, then south to the north shore of Lake Erie and on to an area a few miles east of Hawk Cliff, near Port Stanley, where they pitched into the woods for the night. The next day, with a southwest breeze, he followed the flight inland (missing Hawk Cliff with its hordes of assembled hawk-watchers, who never saw the flight) and finally left it southwest of London, Ontario. This flight was headed for the Detroit gateway, where some years about 50,000 birds have been counted during this season. With the 10,000 or so passing east of Lake Ontario, and a less documented flight around the western Great Lakes, as well as smaller numbers breeding in the woodlands of our southern states, we may estimate the total population as some 75,000 birds. Most of these are spread as a thinly spaced breeding population over a vast area of woodlands in eastern Canada. Although in numbers the Broad-wings form the backbone of both spring and fall migrations, except for late April and late September, our hawk flights will have few or no Broad-wings.

On April 17, 1960, I watched a flight across Selkirk Shores State Park of nearly 1,000 hawks which included 23 Turkey Vultures, no Goshawks, 358 Sharp-shinned Hawks, 10 Cooper's, 45 Red-tailed, 3 Red-shouldered, 446 Broad-winged, 5 Rough-legged, no Golden Eagles, 3 White-headed Eagles, 26 Harriers, 13 Ospreys, no Merlin and no Peregrine Falcons, and 24 American Kestrels.

The Turkey Vulture has come into New York in any numbers only in the last few decades, and the 23 birds seen were a surprise. Presumably they were headed for eastern Ontario and the St. Lawrence Valley. The Goshawk is always rare, and the Cooper's breeds sparingly north of the United States. The last breeding remnant of the Sharp-shinned Hawk is in the Canadian woodlands, and this bird now exists as a mere handful compared with its former numbers. Most Red-tails go through in March and the Red-shoulders also go through before the Broad-wings. The Rough-legs winter in New York and a few birds pass back into Canada, on the way to their sub-arctic breeding grounds, from March until early May. The Golden Eagle is always a rare event, only two or three having been seen in the spring flights at Lake Ontario in the last five years, and the White-headed Eagle is also rare. The figures of 26 Harriers and 13 Ospreys on April 17 may be compared with two weeks earlier when the figures were 90 Harriers and no Ospreys, and of course no Broad-wings. Merlins ("Pigeon Hawks") are always rare inland, and the Peregrine Falcon has largely ceased to breed here in the East, so is becoming an extremely rare bird. Arctic Peregrines, however, still appear in the fall flight along the south shore of Long Island, and in 1959 a record number were seen at Jones Beach. Since most of these Greenland birds pass south over the ocean, they are seen along the coast usually after stormy weather.

Hawk Shooting

Hawk migrations used to be the target of wanton shooting by irresponsible gunners, and the drastic reduction in the numbers of hawks is a tribute to the tons and tons of lead that have been thrown at them in the last half century from such vantage points as Hawk Mountain, and the Pennsylvania ridges, and the beaches of Maine and Cape May, to mention a few. Professor Lambert told me that hawks were shot along the beaches near the Harpswell Laboratory, Brunswick, Me., by the thousands during the first quarter of the present century. Expressing an interest in the bird lice (Mallophaga), dead hawks were shipped to him by the barrelfull. More familiar is the tragic story of Hawk Mountain (before the Emergency Conservation Committee and Dr. Maurice Broun came upon the scene) and the more recent "bloody ridges" of Pennsylvania. Hawks were shot in numbers in New York (at Crow's Nest in the Hudson Highlands, for example.

Protection

All hawks are now protected in New York, Connecticut and New Jersey and many other states. They are similarly protected along the Pennsylvania ridges during the fall flight. Today public opinion considers hawk shooting a disgraceful, as well as an illegal, procedure, and it is to be hoped that it will disappear entirely before our hawks do! It may be emphasized that many former gunners now return to Hawk Mountain armed with field glasses for a much greater reward. The spectacle of the great hawk flights, from the diminutive Sharp-shin and Kestrel to the majestic sweep of the Golden Eagle, is a sight to awaken, to interest, and to inspire.

The Huntington Wildlife — A

The Huntington Forest viewed from Goodnow Mountain

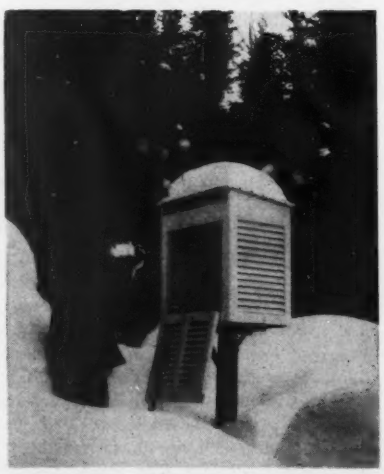
RESEARCH today is big business. Each year billions of dollars pour into our laboratories, missile research centers, schools and hospitals to finance the search for knowledge and progress in our 20th Century science.

Research, too, goes on outside the steel and brick-bound laboratory buildings. In learning to understand and to manage our vast natural resources, scientists must work outdoors, amidst the forests, the rivers and lakes and the wildlife. Laboratory instruments and experiments can reveal a great deal about natural science, but much of the truth about erosion, water conservation, forestry, animals and the way these are all interrelated, can only be discovered out in the open air. Here men can study life, growth and changes as they naturally occur.

In wildlife research and conservation, for example, this working in an "outdoor laboratory" is indispensable. A carcass on the dissecting table can tell us a lot about a deer's bones and muscles, and a certain amount about what it ate, or how many young it had. But the only way to find out how far a deer travels daily and annually, what its living habits are, how weather or hunting affect it, or what enemies it has, is to go outside and study the wild animal in the forest. This is also the best way to learn how deer affect their environment—what damage, or good, they do to trees and shrubs and other animals. Only in this manner can wildlife scientists learn to really know deer and also discover how best to manage and conserve them.

This is true of all our wildlife. A tremendous amount is still unknown about the habits, life histories and ecology of native mammals, birds, fish and other forms. But in more and more places men are trying to meet the challenge, and study animals in truly wild surroundings.

One such "outdoor laboratory," located in the Central Adirondacks, near Newcomb, consists of 15,000 acres of wild mountains, forests and lakes. This is the Archer and Anna Huntington Wildlife Forest Station, owned by the State University College of Forestry at Syracuse University. The tract was given to the College in 1932 by Mr. and Mrs. Archer Huntington, and the deed stated that the land should be devoted to the conduct of wildlife research and investigation.



Huntington Forest weather station

Wildlife research is an all-season business for its faculty of four forestry and wildlife scientists, and the three-to-twelve-man work crew. College of Forestry staff members, such as Prof. Ralph T. King, the first Forest director, and Dr. William L. Webb, also carry on research here, as do graduate students and others. Interests and projects are varied, as are the facilities available.

Study of fish and fresh water is executed in the five major lakes. Forest environments range from virgin timber to burned-over areas, and forest types include magnificent northern-hardwood stands, pure white pine areas, spruce flats, mixed hardwood-conifer and others. Elevations on the area range from 1,300 to 2,700 feet, and weather conditions swing from long, hard winters with plenty of snow, to typical Adirondack summers. Thus, the Forest is an excellent place to study all sorts of wild habitats.

A large portion of the Huntington Forest is criss-crossed by grid lines, forming a checkerboard pattern with squares ¼ mile on a side. These lines, numbered east to west, and lettered north to south, are marked by orange paint blazes through the forest. The grid system facilitates the census of animal populations, and enables workers to locate plots or observations in the woods.

Equipment for wildlife investigation ranges from complicated limnological, electronic, and forestry devices, to traps, tags, binoculars, and snowshoes, rain gear and fly dope. There are numerous office, maintenance, and housing buildings. Fourteen vehicles, and an 18-mile road system enable staff members to reach outlying areas both summer and winter.

Most of the wildlife research is of long-term duration, and projects lasting from 10 to 20 years are common. This kind of research generally involves studies of animal environments. It is important that we know what kinds of

Forest

Outdoor Laboratory

by Earl F. Patric, Assistant Professor in Charge, **and Jeanne B. Patric**

Study of aspen cuttings at Forest beaver pond

surroundings produce best conditions for wildlife, and it is equally important to know how to create such conditions where they do not already exist. To illustrate, most partridge hunters realize that the grouse eats buds during the winter. However, buds alone, even if abundant, offer small nourishment over the long winter. In one research project the Forest staff is attempting to establish fruit-bearing shrubs in the areas where grouse winter. These shrubs must not only bear nutritious fruit, but they must hold this fruit well into the winter so that grouse can continue to locate it. In this way it is hoped that a greater number of strong birds will survive the rigors of winter and be available for spring breeding.

In another long-term research project we are observing the effect of deer upon forest vegetation. To accomplish this, "exclosures" or fenced areas of up to two acres, have been erected to keep deer out. The vegetation within these fenced areas is not affected by deer. By comparing the kinds and sizes of plants inside and outside the fenced areas, the effects of deer on the vegetation can be isolated and evaluated. It is easy to imagine what might result if an exclosure were constructed in a heavily-grazed cattle pasture. Under some conditions the effect of excluding deer is equally dramatic.

Some long-term research is being supported by the New York State Conservation Department. This emphasizes the recognition of important problems by wildlife conservationists throughout the State, and suggests close co-operation in attempting to solve these problems. In one study the effects of tree removal by various procedures is being observed in combination with the removal of litter and duff on the forest floor. These practices may result in greatly increased variety and abundance of low plants used by wildlife. The ultimate value of such research may be more game for the hunter, naturalist, or photographer.

Shrub planting for wildlife food

Since nearly 10 per cent of the Huntington Forest is covered by lakes, studies of fish and fish environments constitute an important phase of the wildlife research program. Lake water is sampled and analyzed to determine its productivity, and to determine means of increasing its productivity. The fertility or productivity of the water can be measured by actually measuring the mineral nutrients in the water, or by measuring the rate of growth of plankton or fish life. Fish are trapped in nets, tagged, and released, to study fish distribution, movements, growth and longevity. Of course, it is hoped that some of the tagged fish will be recaptured so that observations at the time of recapture can be compared with those of the original capture.

Animals other than game species and fish receive attention, too. The growth and habits of beaver and other furbearers form part of the Forest study. And work involving songbirds, mice, squirrels, and insects and other invertebrates is equally essential. For these apparently insignificant creatures actually form a very important segment of the forest community. Their absence or abundance may mean starvation or luxurious living for larger forms. The work done by small animals in distributing seeds, improving basic soil fertility, destroying injurious insects, or, on the other hand, spreading disease or attacking seedlings and shrubs, affects the whole forest economy.

In pursuing a program of research, the wildlife scientist is constantly unearthing problems which were not visualized at the outset. These are the intriguing avenues and side roads branching from the main research highway. Some of these avenues suggest future research projects which are incorporated into the Forest program. Others are equally interesting, but must be by-passed in order to pursue the main objective to completion. The temptation to try to undertake too much is very strong in a field where so much still remains to be learned. Of course, much has been learned. This knowledge is published in professional journals, in bulletins, and in the proceedings of meetings of wildlife scientists.

Unfortunately, most of the Huntington Wildlife Forest cannot be opened to the general public because of the nature of the research underway on the property. One lake, Rich Lake, is open to the public for bathing and fishing (see CONSERVATIONIST, Aug.-Sept., 1955, pg. 41), and a small Nature Trail is also available for interested people.

Of Mice and Men

by W. J. Hamilton, Jr.,
Professor of Zoology,
Cornell University

AS the heavy snows of the 1958-59 winter melted away, many a resident of Jefferson County, was horrified at the havoc that was exposed. Ornamental trees, hedges and shrubs were stripped of their bark; valued roses and flowering plants were cut to the ground or completely girdled; bulbs were eaten. Desolated areas extended along Lake Ontario and the St. Lawrence River and the ravaged vegetation was noted even on the larger islands in the river. This great toll was exacted by hordes of field mice whose chisel-like teeth spared little vegetation. So abundant were these mice that snow plow operators at the Thousand Islands Bridge reported they plowed hundreds of the rodents out of snowbanks during the winter. A LaFargeville correspondent wrote that a neighbor's cat brought 38 of these mice to his back door in a single morning. Such high mouse populations and the resultant extensive damage are, fortunately, not common, but the threat of destruction is always with us and ever poses a hazard to valued plantings.

The Field Mouse at Home

Most common villain of this piece—the field mouse, is a short-tailed, beady-eyed little creature, seldom exceeding six inches in length. Its brownish-gray back and paler underparts serve to distinguish it from most other small rodents. Few other small mammals are so adaptable in the selection of habitat in which to seek their food and rear their young. Field mice swarm on the salt marshes of Long Island, crowding to the very edge of the vegetated beach. Yet I have found them abundant on the boulder strewn top of Mt. McIntyre, well above the Adirondack timber line. However, they are most at home in the the lush meadows, where the damp earth gives rise to a dense vegetation of grasses and low succulent annuals, or in fields that support a canopy of dead grasses. Even within the limits of our larger cities, a vacant lot will often support a family or two of these mice.

Under a protective layer of vegetation, these small rodents prepare compact nests of dried grass. Radiating from these nests, little trails, the width of a garden hose, form an intricate pattern of highways, revealed only when the snow disappears in late winter.

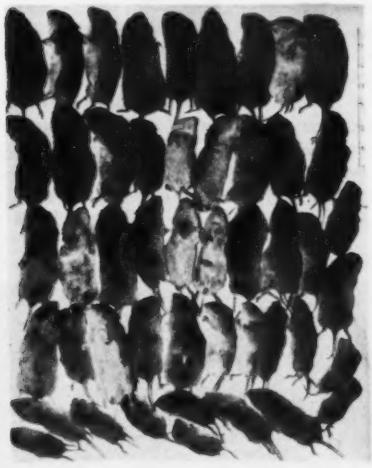
Extreme damage to box elder. Mice worked below snow cover

The field mouse—Number 1 villain

No other mammal can match the reproductive rate of the field mouse. In years of mouse abundance, one litter follows another in rapid succession, until it seems the meadows and fields will boil over with the little rodents. Within a few hours after a female has been delivered of her young, sometimes sooner, she is again mated. The young, like other mice, are blind, naked and helpless at birth, weighing not more than a penny. The young mice are weaned in two weeks, and make off to establish their own quarters, to shortly take up family duties of their own. The famed biologist, Vernon Bailey, kept a number of these mice in captivity, in order to study their reproductive habits. One female which he observed produced 17 litters within a year, while one of her daughters had 13 families of young totalling 78 in number, *before she was a year old!* Small wonder

the fields are periodically populated by vast hordes of these little beasts.

Beset on every hand by a host of predators, field mice live a perilous existence. From above, hawks, owls, crows and other avian enemies patrol the fields; while skunks, opossums, foxes, weasels and even the great bears search out the nests. Nor does that exhaust the hazards for blacksnakes, milksnakes and



Forty-eight field mice trapped from a quarter-acre plot

other reptiles lie in wait for these appetizing morsels. Even the short-tailed shrew, often blamed for the damage caused by mice, will slay and feast on the larger rodent. But in spite of such an awesome array of enemies, the fast-breeding mouse soon outstrips its enemies.

Mouse Cycles

Like the snowshoe hare of Canada and the Norway lemmings, empire among the field mice has its rise and fall. Incredibly abundant one year, scarcely a mouse will be seen the next. What occasions these mouse outbreaks and the drastic levelling of the population which invariably follows? Obviously the prodigious reproductive rate cannot continue for more than a few years, else the entire earth would be teeming with these mice. Our studies in central New York indicate the mouse cycle usually runs its course in four years. High populations may be reached in three years, or delayed for five years. Population of a dozen per acre may increase to 300 or 400 mice per acre in a few years. Then, when a peak population is reached, epidemic strikes and the mice all but disappear. But seed stock is spared, and the great populations are again built from this scant beginning. Population growth is not the same for every cycle. These may come and go for several decades before a culmination of favorable factors allows for mass reproduction. Cycles do not necessarily coincide throughout an area the size of New York State. Thus, in any given year, mice may be abundant, for example, in the Lake Plains of Western New York; scarce in the Hudson Valley.

Orchardists have borne the brunt of the great economic loss caused by field mice. Snow cover is a deterrent to the hunting activities of mouse predators, and, under cover of a white mantle, the mice have free rein to move about in areas they would otherwise shun. Bark is stripped from the base of the trees, and the life line of cambium destroyed.

Beneath the soil these little rodents, and their sleek-furred cousins, the pine mice, cut away the slender roots, weakening the tree and making it susceptible to heavy winds and winter storms. Bridge grafting may save the tree, but often too much has been destroyed to provide sufficient areas for a successful graft. From extensive field observations, I believe New York orchardists may sustain a half million dollar loss in "mouse years."

Mouse Damage

While the orchardist may suffer most severely, he is not alone as an unwilling host to mouse hordes. For example, those who propagate conifers for sale often suffer considerable loss. Scotch pine, Douglas fir, Norway spruce and other cone-bearers are all susceptible to girdling by field mice. Littlefield, Schoonmaker and Cook (*Jour. Forestry*, October, 1946) record extensive damage to coniferous plantings in New York State. Trees planted in sod were heavily damaged in Montgomery County in the winter of 1938-39. Under cover of deep snow, Scotch pines were girdled to a height of three feet and many of the smaller roots were eaten off. Weakened trees that did not succumb to the extensive girdling were tipped over by wind or snow. With the killing of these trees, sizeable openings in the plantations developed, allowing the invasion of sod, which is attractive to these mice. A second attack by mice, coinciding with the peak population four years later, did even more damage than the first, 75 per cent of some stands being girdled.

Loss to alfalfa and timothy are less spectacular and are easily overlooked. Occasionally, however, mice become abundant enough to take a measurable toll in the hayfield. The stalks are severed at the base, then cut in match-length sections until the flower or seed is secured. Less than 10 per cent of the stalk is eaten, but the rest is wasted for fodder. Anyone can see this damage by parting the vegetation of a June hayfield.

In the perennial border, the ravages of field mice often attract the attention of the gardener. The canopy of prostrate or low-growing junipers afford a retreat for these creatures, which sally forth to cut down prized plants. They have invaded my lily plantings, and, under cover of a sawdust mulch, laid waste the bulbs of prized seedlings. Few plants are immune to attack. A measure of protection is the reward of eternal vigilance against the inroads of these pests.

Mouse Damage Control

Control can be accomplished by the use of poisons, traps and wire guards that may prevent girdling activities. These methods are discussed in Cornell Extension Bulletin 729 available at your county agricultural agent's or upon request to College of Agriculture, Cornell University, Ithaca. In the home garden, field mice are easily controlled by ordinary snap-back mouse traps, but, to be effective, at least a dozen traps should be used. The mouse runways should be located in grassy borders of the garden, or anywhere that mouse sign is evident. Traps are set at right angles and flush with the floor of the runway. A pinch of oatmeal or peanut butter is an effective bait. Fresh bait must be added when the trap is cleaned of food by ants, slugs and other tiny creatures. Mice often invade the garden from adjacent grassy or weedy areas that should be thoroughly trapped.

Man's efforts to combat these mice are only of local and temporary effect. Perhaps it is fortunate that no measures have been found to completely destroy these ubiquitious rodents, for their extermination would be as undesirable as it would be impossible. Field mice do little or no harm unless they conflict on occasion with man's interests. On the other hand, they provide food for a host of fur-bearing animals which in turn yield an appreciable annual harvest of furs. Hawks and owls feed on field mice, and thus abstain in a measure from more valuable species.

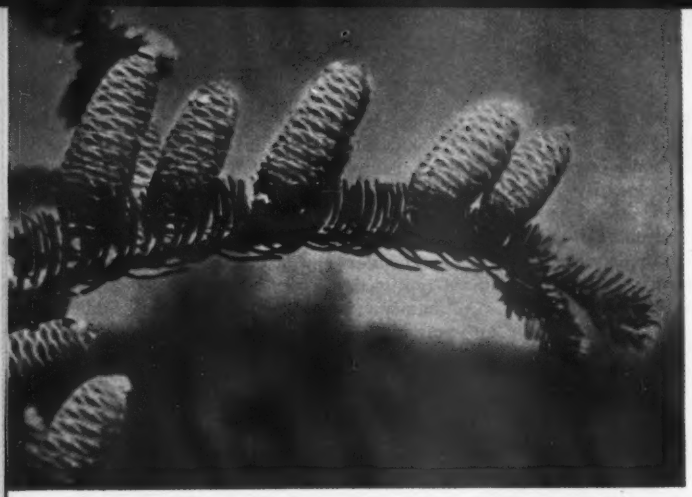


Figure 1, balsam fir cones

Forest Tree Seeds and Fruits

by F. U. Klaehn,
Associate Professor of Silviculture
State University, College of Forestry,
at Syracuse University

WHEN the leaves turn red and yellow in the Adirondack and Catskill mountains, and the colorful days of Indian Summer are at hand, Nature is busy making preparations for the long winter months. High up in the tree crowns, cones are ripened and fruits of the ash trees and tulip poplars and the samaras of the sugar maples are blown off by the wind or released by other means and scattered across the forest floor. The year, beginning with the delicate flowers of spring, has fulfilled its promise of autumn harvest.

If we consider the seed of a tree to be a new and independent plant, then a new tree generation has been produced. Born by the mother tree and nourished until maturity, the seed is now on its own. It is exciting to follow Nature's pattern from blooming to seed ripening to germination. Covered and still protected in the cone of a white pine tree, for instance, are tiny seeds only 2/10 to 3/10 of an inch long. Thousands of these small seeds are produced by an old white pine and each seed has all that it needs to become, after perhaps 200 years, one of the old, grand giants of our forests.

Figure 2, white pine cones

Figure 3, Norway spruce cones

When we speak of tree seed and tree fruits we immediately realize that it is not an easy job to define these terms exactly. Both are used synonymously sometimes, although in the true sense they mean quite different things. To clarify the situation we have to keep in mind that all trees, the hardwoods as well as the conifers, produce seed. In the botanical sense of the word, a viable seed is the result of the fertilization of an egg within the embryosac of an ovule.

The fruit, however, is fundamentally the transformed and matured ovary of a flower. Since we normally don't call the coniferous flower a flower, but rather, a strobilus, a tree cone can properly not be called a fruit, although this is commonly done. The seed of our hardwood trees differ fundamentally from those of the conifers insofar as the former develop inside ovaries; the latter from naked ovules.

One of the most beautiful cones produced by a native coniferous tree is the candle-like cone of balsam fir. Each of these cones (*Figure 1*) wears a white cap of resin, as if they were adorned by a fresh mantle of snow. The balsam fir is among those trees which produce seeds more or less every other year, starting out at a very early age. During the fall, in contrast to other conifers, the balsam fir cone scales become separated from the central spike-like axis and fall away with their large-winged seeds. These winged seeds are scattered by the wind, sometimes aided and abetted by squirrels and other rodents of the forest world.

As in other coniferous seeds, the seed coat covers the two main parts of the seed, endosperm and embryo (*see Figure 1a, pg. 22*). The endosperm, which is food tissue, surrounds the tiny embryo which looks like a miniature shoot. The endosperm provides all the necessary ingredients for the process of germination until the young seedling can take over and manufacture its own food.

Figure 2 shows the cones of our most important timber tree, eastern white pine. Under each cone's scale two small seeds are located. Of special interest is the cone opening mechanism of this and other pine species. The cone scales are very hygroscopic—that is, they act like a blotter in absorbing and retaining moisture. Thus, they expand and contract, warp and twist with alternate dry and damp weather due to differential shrinkage and swelling. Such contortions act to release the winged seeds. The force exerted by cones in opening due to drying has been found to be not less than three foot-pounds.

The cones of Norway spruce are shown in *Figure 3*. Located in the top of old trees, these cones each sometimes contain more than 250 seeds. Squirrels are very fond of spruce seeds and frequently begin to cut the cones from the tops of the trees as early as the middle or the end of August. Later, cut cones are gathered from the ground and stored by the squirrels in caches where they will be available during the winter. So-called squirrel caches can be found containing more than 300 cones collected by a single squirrel in a matter of a few weeks. Such

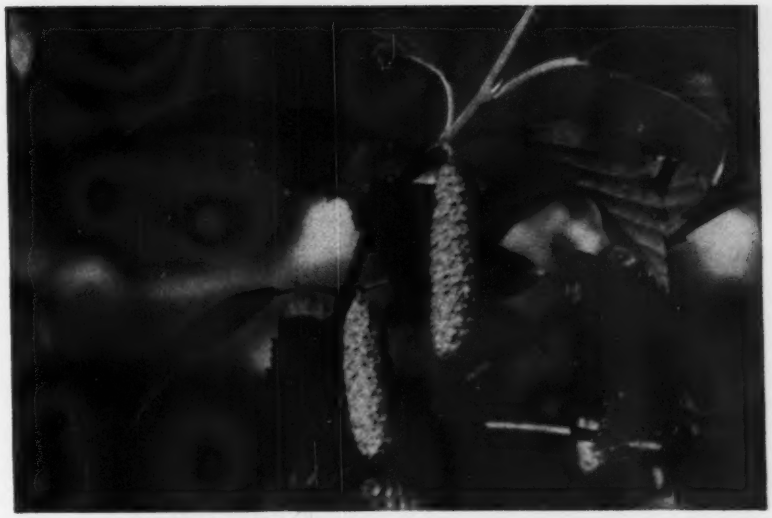


Figure 4, paper birch catkins

Figure 5, red oak acorns

Figure 6, sugar maple winged seeds or samaras

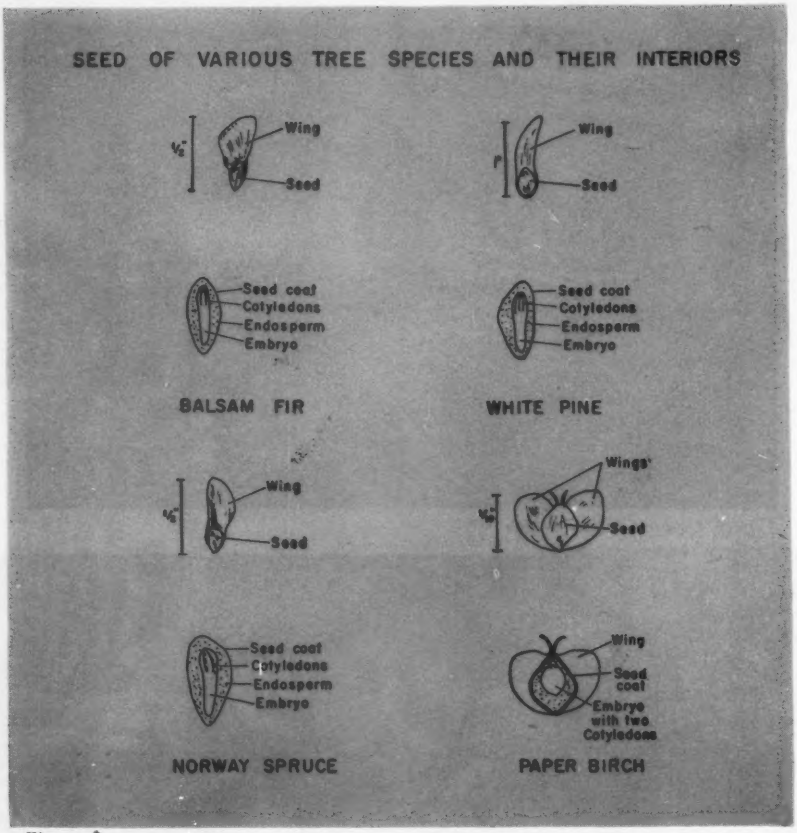


Figure 1a

industry on the part of squirrels is viewed with considerable approval by tree nurserymen in search of seed. It saves them a lot of work and is no great loss to the squirrels since they habitually hoard quantities more than they would need for food.

Coniferous trees normally exhibit a periodicity in seed bearing. This means that good cone crop years appear every second, third or fourth year. Many hardwood tree species, on the other hand, bear plentiful crops every year. This is certainly true for some maple species or poplars, and also to a certain degree for birches. *Figure 4* shows two fruit-catkins of our paper birch a few weeks before the scales and the seed start to disintegrate on the tree after ripening (much as in the manner of our balsam fir). Birch seed are especially small and are equipped with two wings which makes it possible for the seed to reach a favorable seed bed sometimes up to half a mile away. Throughout the winter months one may find birch seed blowing across the snowy crust.

The acorns of the red oak are pictured in *Figure 5*. It took the tree two years to produce the acorns seen in the picture. The acorns, which sit in woody cups formed by the calyx of the flowers, have a protective, hard and very durable outer shell and an inner brown membrane. The acorn embryo has two cotyledons (fleshy leaves in which the food necessary for germination is stored). Because acorns are quite heavy and have no special adaptation for dissemination, they fall normally close to the mother tree. Except for acorns that may be lugged off by squirrels or other animals, oaks have a low spreading ability in contrast, for instance, to the birches.

Fruit of the sugar maple is formed of two samaras or keys (*Figure 6*), which eventually separate from a small persistent pedicle. Each of the samaras is compressed laterally and prolonged on the back into a large papery wing. Opening a samara we will find a seed, also with two cotyledons but lacking endosperm found in conifers. The samaras are released between October and December normally at leaf fall, and come spinning down like miniature propellers. Country and small town people will surely remember, as children, watching in fascination as the maple seeds spun off in the winds of autumn, and then in the spring, seeing the tiny maples sprouting up everywhere through the lawn. Good maple seed crops are produced every three to seven years.

An interesting phenomenon which has attracted special attention is that of seed dormancy. Dormancy means the inactive or resting condition that the seed exhibits when it is released from the mother tree; i.e., "non-readiness" for immediate germination. Most of our forest tree seeds mature in the fall when unfavorable conditions for germination are approaching. As a result of this mechanism the seed lays dormant under the leaf litter on the forest floor until the warm spring days. In the spring germination is brought about by various factors, internal, such as chemical changes in the seed (embryo) which occur during winter, or external influences, such as favorable temperature, or softening the seed coat by decay. This allows the swelling of the embryo and permits the necessary gas exchanges, which is a necessity for all life processes.

Of the species mentioned in this article, only the seed of Norway spruce and paper birch are ready for immediate germination. They exhibit no delayed germination or dormancy. In balsam fir, white pine, sugar maple and red oak, there is either "embryo dormancy" or "seed coat dormancy" present. A very typical example for embryo dormancy is our American ash which might not even germinate the following year but may be delayed until the second spring.

The chemical aspects of forest seeds have been studied very little. We know however, of two groups of stored food material in the endosperm of coniferous seed, and in the cotyledons of hardwood seed. The first group are carbohydrates to which the oils, fats and starches belong and the second is of nitrogenous origin to which the proteins belong. Practically all transformations of reserve materials in seed are brought about by enzymes which mobilize the reserve foods so that they may be used by the embryo in growth.

There is a continuous sequence from flowering to seed ripening and finally germination, a pattern that is repeated by Nature year after year. Most trees produce seed in abundance although this may be at certain intervals. Nature is and must be lavish in seed production. Rodents and birds live on forest seeds and fruits and would starve without them. They don't get them all, by any means, and those that escape all hazards live to germinate. Other dangers however, are awaiting them. Fungi attack the weak seedlings, drought kills thousands and animals continue to feed on them as the seedlings grow. In the words of the old Scotch proverb: "One for the rats and one for the crow, one for drought and one to grow."

Nut Trees of New York

by Morgan P. Smith, Forester
District 11, N. Y. S. Conservation Department

DO you remember, when you were young, climbing into the tops of frost-touched hickory trees to shake down the gleaming white nuts? Or gingerly gathering the prickly-husked chestnuts to pry open for the satiny-brown treasures within? Or trying to beat the squirrels to the harvest of beechnuts? Maybe you have sat in the kitchen, an old-fashioned flatiron propped between your knees, and aimed your hammer carefully at a tough-shelled black walnut or butternut? In the last instance, you'll, no doubt, remember, too, that your thumb was a frequent casualty, but the rich, sweet meats were worth it.

We hope that you were fortunate enough to grow up in the country for, in that case, we're sure you'll remember these happy days, gathering nuts in the fall. But whether country or city-grown, you will have admired the hickories, the oaks, the beeches, and the rest of our nut trees in your rides and walks afield. And, if you are a hunter, they've meant something more to you—a clue to where the best hunting can be found for big and small game alike. It would be impossible to over-estimate the value of our nut trees as a game-food species. We do know, however, that nut trees supply an important portion of the diet of our deer, bear, squirrel, partridge and wild turkeys.

Nor would we do justice to the nut trees of our forest if we failed to mention their popularity in the lumber industry. It would not be unusual to find the log piles at some of our sawmills in the State to contain a high percentage of oak and beech logs waiting to be sawn into lumber; much of which will be processed into high-priced flooring for modern homes. We might, also, find in some localities, black walnut and butternut logs which will be sawn for specialty uses, such as gun stocks, furniture and cabinet work; or in some instances, a pile of hickory logs which will produce wood for skis, tennis-racquet frames or baseball bats.

We could go on in praise of our nut trees of New York, but perhaps we should get better acquainted with them as "individuals" so that we will be sure of their identity when in the woods.

The Oaks

Of the 300 oaks known to the world, 55 are native to North America, and most of these occur in the eastern United States. The oaks make up the largest group of forest trees native to New York State.

The best way to get acquainted with the oaks of New York is to divide them into two major groups—the white oaks, and the red oaks. It is easy to place the oaks of New York in these two groups by remembering the following characteristics of each:

The White Oaks: The leaves of the members of this group have rounded lobes (not bristle-tipped), and the kernels of the acorns are usually sweet. All the oaks of this group mature their acorns in a single season; for this reason they are sometimes called "annual oaks." The seven New York members of this group are white oak, swamp white oak, bur oak, post oak, chestnut oak, yellow oak and scrub chestnut oak.

The Red Oaks: The leaves of the members of this group, sometimes called black oaks, have bristle-tipped (not rounded-lobed) leaves, and the kernel of their acorns is usually bitter. All the oaks of this group require two seasons to mature their acorns. The immature acorns are very helpful in recognizing the members of the red oak group, especially, during the winter months when the trees are without leaves. The nine New York members of this group are red oak, black oak, scarlet oak, pin oak, Spanish oak, Black Jack oak, Elliott's oak, willow oak and scrub oak.

Space does not permit a description of all the oaks above listed. We will, however, describe the most common member of each of the two groups.

WHITE OAK *Quercus alba.* This tree together with its variety (*Quercus alba var. latiloba*) is the most common and important of eastern white oaks and contributes about three-fourths of the wood sold under this name. An early writer had this to say: "They have in Virginia a goodly oke which they call the white oke because the barke is whiter, than of thers—the Ackorne likewise, is not onely sweeter than others, but by boyling it long it giveth an oyle which they keepe to supple their joynts."

The leaves are simple, alternate, 5 to 9 inches long, 2 to 4 inches wide. They are divided into 3 to 9, usually 7, blunt-pointed, finger-like lobes. Mature leaves are deep green above and light green beneath.

The light brown nuts are about ¾ of an inch long, seated in a warty cup enclosing about ¼ of the nut. The bark is grayish-white and peels off in numerous loose scales. The twigs are smooth, light-gray dotted with light lenticels.

The wood is heavy, hard, strong and durable. It is used for interior finish, flooring, furniture, barrel staves, railroad ties, general construction, implements and fuel.

The white oak is common throughout New York south of the Adirondacks and locally northwards. This tree reaches its best development on rich, moist, soil, where it attains a height of 75 to 100 feet and 2 to 4 feet in diameter.

RED OAK *Quercus rubra, Linnaeus.* The red oak is one of the biggest, stateliest, and handsomest trees of eastern North America. As early as 1740, it was introduced into Europe.

The leaves are simple, alternate, 5 to 8 inches long, 4 to 5 inches wide, 7 to 9 lobed. Lobes are forked and bristle-tipped.

The fruit is an acorn about 1 inch long, the nut enclosed only at the base in a thick, saucer-shaped cup; kernel, bitter (as Seton aptly remarks, red oak, strictly speaking, "has no cup, it has a saucer").

The bark is dark brown, with broad, flat ridges; on very old trees heavily corrugated. The twigs are reddish brown, moderately stout.

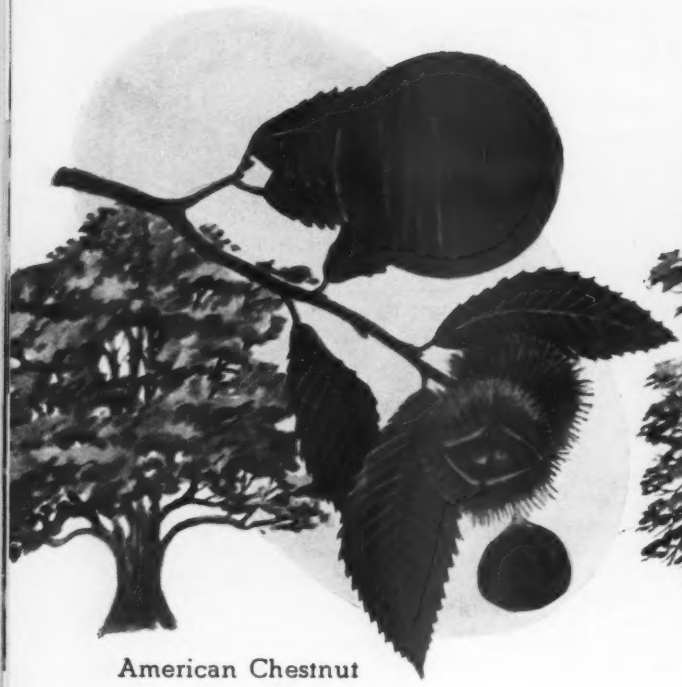
This tree is found in rich woods and uplands across New York outside of the Adirondacks, where it occurs up to 1,500 feet, and in the Catskills up to 2,500 feet. Moist, porous, sandy to gravelly clay soils are its favorite homes. It is one of the most important timber trees of North America. It has been known to grow 150 feet in height and 5 feet in diameter (breast high).

The wood is inferior to that of the white oaks but is used for similar purposes (see white oak).

Red oak makes rapid growth and is used to some extent as an ornamental.

For those who are interested in more detailed information about the oaks, may I refer you to an article on oaks by E. W. Littlefield in the August-September, 1951 issue of THE CONSERVATIONIST.

(Continued on page 26)



American Chestnut

Beech

Some Nut Trees in

Horse Chestnut

Shagbark Hickory

Black Oak

White Oak

sin New York

Black Walnut

Butternut

(Continued from page 23)

The Hickories

Leaves of the hickories are compound, alternate, usually with fewer leaflets than the walnuts; leaflets are lance-shaped to elliptical or oblong, serrate, more or less fragrant when crushed.

The fruit of the hickories is a bony nut, usually whitish on the surface, enclosed in a husk that splits and usually falls apart when ripe; seed, sweet and edible or bitter, depending on the species.

Twigs of the hickories are moderately stout to slender, tough and easily tied into knots without breaking: buds, alternate; terminal, present; leaf scars, conspicuous; pith, five-angled in cross section, solid.

SHAGBARK HICKORY *Carya ovata.* The shagbark hickory, also called shell bark hickory, is the best known of all and has the most distinctive features of all the native hickories.

A medium-sized tree, 70 to 80 feet high and 1 to 2 feet in diameter with a straight cylindrical trunk and more or less oblong crown.

Leaves are 8 to 14 inches long, compound, with 5 to 7 leaflets. The three upper leaflets are the largest, the pair nearest the base is usually only about one-half the size of the terminal ones.

The fruit is round, 1 to 2 inches long, with husk that splits into 4 sections from apex to base. The nuts are smooth, white, 4-angled, pointed at the ends. The kernel is large and sweet.

The bark is smooth and light gray on young stems; on old trunks it becomes distinctly shaggy. The twigs are reddish-brown to gray, covered with numerous light dots, usually smooth, sometimes hairy. The buds are egg-shaped, blunt.

This is one of the best commercial hickories. It produces a heavy, hard, strong, wood, well known for its ability to withstand sudden shocks. For this reason, it has held first place in the making of axe handles and formerly wheel spokes for automobiles. Used also for bows and skis. Ranks first in fuel value of the common American woods; used in the campfire, it leaves a hot bed of coals ideal for broiling. Good charcoal can be made from it and the ashes are useful for soapmaking.

Hickory nuts are a favorite food of the gray squirrel and have been found in the stomachs of several of the larger birds, such as grouse, turkey, ring-necked pheasant, wood duck and black.

This tree is common in most sections of the State outside of the Adirondacks and the higher Catskills. Not reported from the pine barrens of Long Island.

Two other species of hickory are common to New York: Bitternut hickory and pignut hickory. Bitternut hickory bark is light gray, rather thin, roughened by shallow furrows, does not scale nor shag off. The twigs are slender, smooth, grayish to orange brown or reddish. The buds are long, flattened, blunt-pointed, covered with 4 yellowish scales. The fruit is a thin-shelled nut with bitter kernel. The wood is inferior to that of the shagbark hickory, but is used for practically the same purposes.

Pignut Hickory is also an important forest tree. The bark is close-fitting, dark gray, marked with shallow furrows, does not shag off. The twigs are smooth, tough, reddish-brown marked with pale dots. The buds are oval blunt-pointed, reddish-brown. Meat of the nut is usually small and bitter, and not edible.

The wood is similar to that of the shagbark hickory, but somewhat superior to bitternut hickory.

Beech

No hardwood tree is more beautiful or more easily recognized than the American beech (*Fagus grandifolia*). It is a medium-sized tree 70 to 80 feet high and 2 to 3 feet in diameter, with a short trunk and wide-spreading crown.

Leaves are alternate, simple, 2½ to 5 inches long, 1 to 2½ inches wide, elliptical, with a serrate margin, each principal vein ending in a tooth, smooth above, smooth below except for hair in the vein axils.

Twigs are brownish gray, slender, more or less zigzag; terminal bud, present, similar to the laterals, ¾ inches long and lance, or cigar-shaped with many scales.

Fruit, a characteristic nut, ½ to ¾ inches long, triangular in cross section and enclosed usually in pairs in a four-parted bur covered with weak unbranched spines; nuts, sweet, edible and are important as food for many small animals including mice and squirrels, and are also eaten by bear, raccoon, turkey and ruffed grouse.

Because of its smooth gray bark, beech usually had a great attraction for that species of forest-park vandal, the "initial" carver. Harlow writes: "Nothing good can be said for the practice of trying to attain a cheap immortality by scarring the otherwise attractive tree trunk."

The wood of beech is very hard, strong, tough, not durable in contact with the soil. It is good for flooring and is used in the manufacture of charcoal, chemicals and novelties.

The leaves of the European beech were used to stuff mattresses and were preferred to straw because they lasted for years without getting musty.

Black Walnut

The black walnut (*Juglans nigra*) is more fortunate than many trees in that it has only a few common names. Throughout its entire range of 650,000 square miles, it is called walnut, black walnut or walnut-tree. It is a medium-sized to large tree, 70 to 94 feet high and 2 to 3 feet in diameter (max. 150x6′).

The compound leaves are 1 or 2 feet long with 15 to 23 lance-shaped, sharply-toothed leaflets attached to a slightly hairy stem. The globular, light green fruits are an inch and a half to three inches in diameter, consisting of a thick pulpy hull surrounding a single nut whose hard, deeply grooved shell protects a kernel of unusual flavor.

The nuts mature in a single season, during September and October and frequently remain on the trees a week or two after the leaves have fallen. They are prized by squirrels. The kernels are used by confectioners, bakers and makers of ice cream, because the distinctive flavor and texture is not lost.

In winter, walnut trees may be distinguished by the sturdy crown, dark deeply grooved bark, stout twigs and the large gray, downy, terminal buds. The smaller, downy side buds are alternate and above a heart-shaped, three lobed leaf scar, with three U-shaped bundle scars. The diaphrams of the chambered pith of black walnut are thin and pale buff while the butternut's dark, coarse.

Black walnut is valuable for its color, figure and the fine polish it takes. It is stronger than white oak, weight for weight. It is never used as rough lumber. It all goes to factories of some kind to be converted into such finished commodities as sewing machines, musical instruments, coffins, furniture, gun stocks, etc.

This tree is found from southern New England to Minnesota and south to Florida. In New York it is common north to Saratoga and Jefferson counties and westward to Lake Erie. It is rare in the Chemung and Tioga sections, and generally less common than formerly.

Butternut

The butternut (*Juglans cinerea*), also called white walnut, is close kin of the black walnut.

The leaves are alternate, compound, with 11 to 17 leaflets, which are finely serrate on the margin. Unlike black walnut, the leaves always have a terminal leaflet.

The fruit is a large ovoid "nut"

1½ to 2½ inches long; the outer layer, somewhat fleshy and covered with sticky hairs; the inner, hard and bony and marked with sharp ridges; seed, sweet, and edible.

Twigs are greenish brown, stout, with chocolate-colored, chambered, pith; terminal bud, present, longer than in black walnut, larger than the laterals; leaf scars, large and conspicuous, each with three U-shaped bundle scars.

The bark is ashy gray, at first smooth, soon divided into broad ridges, eventually deeply furrowed; the furrows separated by narrow flat-topped ridges.

Butternut bark has played a rather important role in the country's affairs. Doctors in the Revolutionary War made much of their medicine of the roots and bark of this tree. Housewives dyed cloth a brown color with this bark long before analine dyes found their way into this country. Whole companies of Confederate soldiers from the mountain regions in the Civil War wore clothes dyed in decoctions of butternut bark, and were popularly known as "butternut jeans."

Butternut is of secondary value as a timber tree, since the form is poorer and the wood softer and weaker than that of black walnut. The wood has figure similar to that of black walnut, but the color is lighter. It is nearer brown than black. It is used for cabinet work, fixtures for stores and offices, and for furniture. In Michigan its reported uses are boat finish, interior finish for houses, molding and screen frames.

The butternut is found from New Brunswick to Minnesota, south to Delaware and Arkansas and along mountains to Georgia. This tree is common across New York, but remains below 1,500 feet in the Adirondacks. It prefers rich, moist calcareous soil; is most frequently found along streams, fences and roads, and rarely exceeds 50 feet in height and two feet in diameter.

Horse Chestnut

Horse chestnut (*Aesculus hippocastanum*), a member of the Buckeye Family, has been carried by man from its original home in the mountains of Greece over a considerable part of the civilized world.

The leaves are opposite, compound with 5 to 7 leaflets. The leaflets are 5 to 7 inches long, about 2 inches wide, inversely egg-shaped arranged in fanlike form.

The flowers appear in May or June, are large, white, with throats dotted with yellow and purple, arranged in upright clusters 8 to 12 inches high. The fruit is a leathery round capsule, about 2 inches across, roughened with spines, and containing 1 to 3 shiny-brown nuts.

The Galway Lake chestnut tree

American Chestnut

Although our native American Chestnut (*Castanea dentata*) was wiped out of New York during the period between 1904 and 1920 by the chestnut blight, occasionally we find trees of the size shown in the above photograph. This particular tree stands on the west shore of Galway Lake in Saratoga County on the property of Cass Museloff. It is approximately 12 inches in diameter, breast high and about 40 feet tall. It appears to be of seedling origin rather than a stump sprout and when inspected early this summer did not show any outward signs of blight.

For those readers who are interested in chestnut trees, and I know there are a lot of you, it might be of interest to refer back to December-January, 1958-59 issue of THE CONSERVATIONIST to the article by Leonora D. Price entitled, "New Chestnuts for Americans."

Since the Conservation Department is interested in learning of the location of native American chestnut trees which have reached the size of 12 inches or over in diameter breast high (4½ feet above ground), the following description is for the information of those who may not be familiar with its characteristics:

Chestnut was a medium-sized-to-large tree, 70 to 90 feet high and 3 to 4 feet in diameter.

Leaves are alternate, simple, 6 to 8 inches long, about 2 inches wide, oblong, lance shaped; sharply coarsely serrate with each principal vein ending in a hair-like point, smooth above and below.

The fruit is a rounded nut about ¾ inches long borne in 2's or 3's in a bur, covered with long, needle-sharp, branched spines; nut, sweet, edible maturing in September or October. One writer remarked as follows: "The nut of this tree is hung high aloft wrapped in a silk wrapper which is enclosed in a case of sole leather, which again is packed in a mass of shock absorbing vermin-proof pulp, sealed up in a waterproof iron-wood safe and finally cased in a vegetable porcupine of spines, almost impregnable."

The twigs are reddish brown, slender to moderately stout, with star-shaped pith; terminal bud, lacking; laterals, ovoid with two or three visible scales; leaf scars half round.

The bark on branches and small trunks is smooth, brownish and close-fitting; on old trunks becomes grayish-brown and deeply furrowed.

Original range of chestnut was from southern Maine to southern Michigan, south to northern Mississippi and northwestern Florida (below Virginia not on Coastal Plain).

This tree was common locally across New York south of the Adirondacks, but rare or absent in the pine barrens of Long Island and infrequent on soils rich in lime.

The wood is light, soft, not strong, coarse-grained, durable. It was used for posts, poles, ties, general construction and interior finish.

The Catskill Tanning I

ONE hundred years ago New York's Catskill Mountain region produced more tanned leather than any other area in the United States. Today the tannery has vanished from the Catskill scene; gone with the supply of hemlock bark that supported this flourishing industry during the brief 30-year period from 1840 to 1870.

The mountains of the Catskill counties contained great quantities of hemlock with its thick, channeled bark; more plentiful than any place else in the State, the supply seemed inexhaustible. The "red" leather, characteristic of these early tanneries, derived its hue from the color imparted to the tanning liquor by the amber-tinted bark of the eastern hemlock. The Catskill Counties of Orange, Sullivan, Ulster, Schoharie and Delaware enjoyed the additional advantage of location on or near the Hudson River, a natural highway to New York City and the Atlantic. Moreover, the Catskills were rich in water, the many streams supplying the water that was needed for the hundreds of tanning establishments. Adding up all these advantages, it's not surprising that by 1840 most of the little population centers in that mountain area contained tanneries, their smokestacks issuing a pungent wood smoke.

Actually, the tanning industry in New York got its start 200 years earlier, when, in 1638 the Dutch built a tannery on Manhattan Island (then a part of New Netherland). But any industry needs customers for the goods it produces, and until the late 1800's the Catskill Mountain region could boast little in the way of permanent settlement. Further hindrance to private commercial development existed in the form of the original "feudal" type of land ownership by influential families. The influence of these feudal tenures was not completely eliminated until 1846 when the Constitution of the Empire State wiped out all possibility of a manorial system in New York.

By 1830, when leather tanning secured a foothold in the Catskills, many commercially-minded citizens had grasped the importance of the huge supply of hemlock bark, waiting to be exploited for its valuable tannins. Evidence of this fact comes from Quinlan's "History of Sullivan County" in which the author states: "Bark was cheap as well as labor, while leather was dear." The advance of the tanning industry was rapid, and by 1850 the Catskills had become the leading leather producing region in the country. Figures quoted from the "Report of Growth of Industry in New York State" show that by 1860 the five counties mentioned above accounted for nearly one-third of New York's annual dollar value of tanned leather. At this time, the Catskills yielded $7,034,438 worth of tanned leather annually, with Sullivan County producing half of this total.

Tanneries varied in size from very small establishments employing three or four workers to large, well-planned operations such as the Palen tannery built in the year 1832 on the falls of the Neversink in Sullivan County. The main building of this tannery measured 40x350 feet and contained 160 tanning vats, capable of holding 25,000 sides of leather. In operation, the business required 4,000 cords of hemlock bark yearly (a cord is roughly equivalent to one ton of bark). About 40 workers earned their living under the roof of this one building, while additional manpower was needed in order to harvest the huge amounts of bark. The Claryville tannery, built in 1848, also in Sullivan county, was even larger. It employed 50 men and tanned 30,000 sides of leather annually.

The task of getting the bark to the tannery was no small chore either! Removal of bark from the tree was a seasonal job, generally done in the spring months when sap flow had begun and when the bark peeled easily. A crew of two or three men first removed a four-foot ring of bark from the trunk base before felling the tree. With the hemlock on the ground, additional rings were cut at four-foot intervals along the trunk and the bark was peeled with a spud.

Drying the bark by leaning the strips against the felled trunk took from a week to a month, depending upon the weather. While most of the bark was taken from the forests with sleds and wagons during summer and fall, some was left until snow was upon the ground. Bark was left drying with the inner side up since the ross, or outer bark, contained greater amounts of tannin to be protected from the weather. Further seasoning of the bark at the tannery made tannin extraction easier.

What of the hemlock tops and trunks from which the bark had been removed? Today, about all that can be found are hard knots, lying atop the ground or blending into the forest floor beneath a layer of leaves. The statement that "bark was cheap" might well be revised by taking into account the dollar and cents value of the millions of board feet of hemlock timber skinned of its bark and left to rot on the forest floor.

From 1850 to 1870 when the Catskill region dominated as a producer of tanned leather, tanneries bustled. Hides were limed and dehaired, cleaned of flesh over "fleshing beams" and immersed in tannin solutions. Leaching of the bark with heated water to obtain tannin was a continuous process since in tanning, hides require periodic additions of tanning liquor. For maximum tannin extraction, grinding or shredding of the bark was necessary.

Tanning techniques differed depending upon whether heavy or light leathers were being tanned. Hemlock bark was found particularly suitable for tanning shoe sole and harness leathers, imparting extra toughness to the product. These heavy leathers required longer

Hemlock bark stockpiled in huge house-like stacks

g Industry — Its Rise and Fall

by Jack E. Hope

soaking and liming and needed to be exposed to the tannin solutions for months. In contrast, thinner hides for gloves, shoe uppers and other garments were treated to obtain maximum flexibility. Light material did not require the "filling" action of the tanning mixture which brought about the extra strength of the heavy harness straps or shoe soles. Thus, preparation of thin skins took a comparatively short time. Regardless of hide thickness, a thin strip cut from the edge of a hide told the tanner when the "tan" had penetrated the full thickness of the skin.

But the tanners, whose aim it was to "convert the forests to cash at the least possible expense," added to their bank accounts at the loss of their future. By 1870 the Catskills fell behind the Southern Tier and Adirondack counties in leather production. At this time, New York likewise lost her lead to Pennsylvania, with tanning establishments declining in number from more than 1,000 in 1870 to but 147 in 1900, following state-wide depletion of hemlock.

It's small wonder that the supply of hemlock bark disappeared. Following tanning processes of the day, one "long" ton (2,240 pounds) of hemlock bark was needed to tan between 200 to 300 pounds of leather. With tanneries the size of that owned by Rufus Palen, mentioned above, using as much as 4,000 long tons of bark yearly, the hills were soon denuded of hemlock. Succeeding forest growth of birch, beech and poplar followed the hemlock. These three species, along with a few others, are the "natural successors" in the Catskill area, ruling out the possibility of natural replacement of the hemlock stands. Profit-minded tanners did not heed the warnings of the few foresighted individuals who predicted the inevitable exhaustion of the hemlock stands and the downfall of the tanning industry.

At the turn of the century, Catskill tanneries were on their way out; only eight small businesses remained. The area also possessed oak and chestnut, which could have been used for tanning, but these species were relatively scarce and their utilization for tanning would have been impractical.

During their period of prosperity these tanneries were not benefited by any of the more modern advances in tanning technology. Beginning about 1880, labor-saving machinery and new tanning compounds found their place in American leather manufacture. Although the plant extract, tannin, is still the leading ingredient in tanning formulas, its importance has been diminished by the popular use of oils, aldehydes, chrome and synthetic tanning materials. But the revolutionary formulas and mechanical advantages of modern tannage came too late to save the tanning industry and the hemlocks of the Catskills. The region's importance as a leather producer vanished as quickly as it came about.

Had this heavy exploitation of the hemlock been postponed by some twenty years, modern technology might have prevented the complete disappearance of the Catskill tanneries. But no amount of enlightenment now can restore these tanneries nor the great tracts of hemlock that played such a brief but dramatic role in the history of the Catskills.

The 1960 Conservation Workshop

by Harlan B. Brumsted, Extension Conservationist, Cornell University

A Review of Eastern Long Island's Vast Natural Resources and Her Problems with People and Conservation

Question: To which one *New York State county would* all *of the following situations apply? (1) The most rapidly expanding human population in the State,* and *an agriculture that ranks first in New York? (2) Thousands of resident sports fisherman, relatively few of whom ever purchase a fishing license? (3) Still half forested, the land supporting a thriving population of white-tailed deer, yet legal harvest is limited to the relatively few deer taken under permit by landowners suffering crop damage.*

Answer: Suffolk county—the eastern two-thirds of New York's prominent appendage to the south—Long Island.

IN this County of Suffolk, amid its unique association of natural resources, problems and the paradoxical situations that relate to them, fifty sportsmen-leaders met in mid-June, this year, to study the impact of people on natural resources. The occasion was the 10th Annual Sportsmen's Conservation Workshop and the second annual meeting of a Marine Resources Workshop. The setting, for pursuing this theme, was perhaps as nearly ideal as exists anywhere on this continent.

From a base at the Suffolk County Boy Scout Council's Camp at Baiting Hollow near Calverton, the group followed the traditional pattern of participating in field trips to examine problem situations first-hand and to discuss them and possible solutions with subject matter authorities.

The program enjoyed an auspicious beginning for the opening session was addressed by Dr. Robert Cushman Murphy, world famous zoologist, explorer and naturalist. A life-time resident of Long Island, Dr. Murphy drew on seven-plus decades of study and experience in describing the area's geology, flora and fauna. His vivid and forceful descriptions of the changes man has wrought in this natural environment through three centuries of colonization set the stage for the meeting admirably.

Friday, June 17, the first full day of the workshop, the group proceeded east to tour the North Fork of the Island's extremity, the heartland of its intensive agriculture and location of important commercial fisheries. Land use, agriculture and commercial shellfisheries and finfisheries were the objects of study.

Visit this part of Long Island, see the neat, straight rows of the potato fields stretching in every direction and what you view will leave no doubt about the pre-eminent position of Suffolk County in potato production in the State and in the Nation. We visited the farm of one of the 996 local growers, Harold Evans, Jr., of Northville, and learned something of the great knowledge, skill and investment required to produce his 150-acre crop. By following sound soil and water management practices, Mr. Evans is able to maintain potato production on some acres that have been in this crop for over a century.

No consideration of Long Island agriculture would be complete without a glimpse of Suffolk County's world famous duck industry, where 53 farms produce 7 million ducks annually—60 per cent of U. S. production. Workshop participants had this opportunity by visiting the Crescent Duck Farm at Aquebogue, a large operation, complete from egg production to processing plant and a freezer that can handle 3,000 birds a day. Since wastes from these farms constitute a pollutant of considerable concern in some Long Island streams and shore waters, the group was especially interested in seeing how the problem was handled to conform with public health regulations.

In an effort to describe some aspects of the Island's $10 million shellfish and finfish industries, tours were arranged of the Northern Oyster Company's plant at East Marion and of the Cooper fish processing plant at Greenport. At the latter establishment, the group again witnessed an A to Z operation; whole flounders processed from filleting to the frozen pack ready for a supermarket fish counter. Later, a few minutes free time at the Greenport docks afforded the opportunity to look over trawlers in the local commercial fleet and to visit with their crews.

But this wasn't all for the day. After a necessary interlude of free time to permit some degree of recovery from a Long Island shore dinner, leading problems centering on New York's marine resources were presented through a panel ably moderated by one of the State's most outstanding outdoor writers, Ed Moore of *The Journal American.* Aspects of the controversy between salt-water sport and commercial fishermen were aired; we heard comments of the vital role of town and county govern-

Marine biologists demonstrate abundance, variety of small fish in bay waters

ments in the conservation of these resources, and the status of the shellfish industry was described. The question of a license for salt-water fishermen inevitably arose and produced liberal and fervent comment.

The panel served well to point up the unique nature of marine resource problems; their breadth, complexity and urgency. This observer was left with the clear impression that the most pressing of the long-overdue needs for action on marine problems—additional law enforcement, facts on the resources, follow-up management practices and improved access opportunities—are precisely the things that could be provided by revenue from a salt-water license! If this upstate resident may be permitted to venture an opinion, it's high time to call a halt to the petty bickering and name calling among and between groups of sportsmen, conservationists and commercial fishermen that shrouds this question and to get together to study this and other means for filling in the frightening gap between where we are and where we ought to be. For a State that so often has been a pace-setter in managing its wildlife, indeed all natural resources, there certainly is little that we citizens can be proud of in the way we have handled our marine resources. We must face up to this situation and pull together for action—NOW.

On Saturday, salt-water sport fisheries, park developments and wetland resources took the spotlight. Traveling through the more densely populated townships of Western Suffolk County, signs of rapidly expanding human population were at every hand. Here it's an eastward movement; oak-pitch pine forests and potato fields giving way to the bulldozer and to new crops of houses that follow. Problems associated with this suburban sprawl attract much attention these days, but it was our purpose to observe the impact on natural resources, particularly those that provide recreation and support commercial fisheries.

During field trip stops along the South Shore on Great South Bay we witnessed situations of marked contrast. Extensive State and town parkland in various stages of development stretch along the shoreline for miles—striking examples of vision, planning and co-operation to provide and to insure outdoor recreation opportunities for literally millions of people. But a second look discloses that the environment that supports popular segments of outdoor recreation here—sportsfishing and waterfowl hunting—as well as parts of the local commercial finfish and shellfish industries, are in serious jeopardy. We refer specifically to the wetlands, extensive areas of tidal marsh that, by producing the food and shelter on which fishes, shellfish and waterfowl depend, constitute the essential foundation for the animals that are objects of recreation sought by the fisherman, hunter or amateur naturalist, and of the harvests of the commercial fishermen. However real and vital these dependencies may be, in popular thought, wetlands still are wastelands and they disappear at an accelerated rate; drained, dredged, filled, burned, and poisoned under the pressure of expanding housing, industrial, and recreation development.

Making a sample haul in Great South Bay. "Emeline M." research boat offshore

Neither the many facets of the problem nor the possible solutions are at all simple, but with the skilled help of biologists from the State Conservation Department, the United States Fish and Wildlife Service and Cornell University, we gained a good basic understanding of the situation.

One bright ray of hope in this otherwise dismal situation is the existence of New York's Long Island Wetlands Bill that became law in the spring of 1959. Under its provisions, the Conservation Department may co-operate with towns or counties that dedicate wetlands for conservation purposes, to the extent of paying all development costs and one-half the costs of maintenance. Workshop participants saw the first application of this law where the high quality 500-acre wetland tract known as Tobay Pond will be preserved and improved as the result of a co-operative agreement between the Town of Oyster Bay (Nassau County) and the State Conservation Department.

The concluding portion of the workshop program provided a summary as eloquent and challenging as had the introduction by Dr. Murphy. Our featured speaker was Dr. Justin W. Leonard, Assistant Director for Research, Michigan Department of Conservation. Addressing us on the subject of our theme, "The Impact of People on Natural Resources," Dr. Leonard emphasized the urgent nature of the earth-bound race for space that threatens to limit the many forms of outdoor recreation we cherish in our present way of life. In his view, this constitutes a conservation problem that cannot be left for future generations to solve; time is so critical that action on many fronts must come in the next few years. He urged public planning as a solution to the unplanned development of open space which so often is ultimately detrimental to the public interest.

Oysters and ocean-oriented recreation are a bit hard to come by upstate but the lesson holds for all corners of the Empire State: Our burgeoning human population has a forceful impact on natural resources; the penalties of failing to recognize and to meet these pressures and to plan for the future are severe.

604-pound black bear, ear-tagged and still groggy from ether, at release point. This record bear, and more than 150 other tagged bears, still at large in Adirondacks. The tags, information on site of kill, plus the skull are worth $25 to sportsmen who take them.

"There Goes a Bear!"

by Stuart Free, Conservation Biologist

NO cry among big game hunters afield is more electrifying or better calculated to cook up a big head of interest and excitement than: "There goes a bear!" Here in New York, many a hunter hears that shout each year and the noise is on the increase.

The black bear, New York's biggest game animal, is an impressive sight in the wild; a challenge to the sportsmen. It is impressive and fascinating also to thousands of tourists to our forest areas; a pest and worse to those whose camps have been raided by bruin, and a mystery still, in many respects, to game biologists although recent studies have netted much new information.

Among the bear data sifted in the course of research studies in New York were reports of successful hunters for clues to the extent of bear range and bear population densities. Where can bears be found in greatest numbers for hunting, photographing or just observing? We came up with a few answers, such as these: Black bears inhabit nearly 29 per cent of New York State's land area. Now, think of that one for a second. Amazing, isn't it, that here in New York, teeming with humans, famous for its huge and bustling cities, that upwards of one-third of our land area should retain sufficient wilderness characteristics to attract and support these huge wild animals?

Bear populations are spread generally over three principal areas of the State—the Adirondacks, Catskill and Allegany ranges, totalling 14,050 square miles. The characteristics and boundaries of good bear range have not been well enough defined to break these large areas into smaller units of actual range. Therefore, the land areas designated as bear range are the *total* land areas of townships where hunters have reported taking bear. Only townships in counties with a calculated bear take of at least five bears for the five-year period 1954 through 1958 have been included. No attempt was made to exclude roads or open land areas not truly representing bear range, or to include all the sight and sign records from other townships.

Big game hunters have done quite well and bear populations have held up well in counties having resident populations. During 1954 through 1958, 2,051 bears were legally removed from the three ranges during hunting seasons. Another 14 bears were removed from counties having a calculated take of one to three bears during this period, but

This article is based on studies conducted by the Conservation Department in Project W-89-R under the PR (Federal Aid in Wildlife Restoration) program.

Tips on Where to Hunt for New York's Biggest Game Animal

these were probably transient or wandering animals, not representing established resident populations.

The largest number of bears and the largest land area of bear range are found in the Adirondacks. Sportsmen bagged an average of 295 bears per year during 1954 through 1958 while hunting some 9,941 square miles of the Adirondacks. Dividing the square miles of land area by the average number of bears taken per year gives a bear density index of a little better than 33.7 square miles for each bear taken per year in the Adirondack range. The same type of index for the Catskill range results in 34.2 square miles of land area for each bear taken per year. The Allegany range has a bear density index of 43.3 square miles of land area for each bear taken per year. In other words, if bear hunting you would go, your chances are a little better in the Adirondacks than in the Catskills, and considerably better in both the Adirondacks and Catskills than in the Allegany country.

To gain a clearer picture of the relative size and abundance of bear populations, these density figures should be viewed in relation to hunting pressure. Bear and deer seasons run concurrently, except for an extension of the bear season for 15 days beyond the deer season in Delaware, Greene, Sullivan, and Ulster counties. The majority of all bears taken are, therefore, harvested during the deer season by individuals who are hunting deer, primarily, but who recover from their surprise at tripping over a bear in time to bring bruin to bag. Relative bear hunting pressures per county were determined from a study originally designed to measure deer hunting pressures. Tabulations were made from 1956 big game license stub notations recorded by issuing clerks at the time of license purchase, indicating the areas wherein licensee intended to hunt.

The information obtained from this study shows hunting pressure in the Allegany range counties to be about 16 to 40 hunters (average—24 hunters) per square mile of deer range. The Catskill range hunting pressure varied from 12 to 29 hunters per square mile of deer range, averaging 20 hunters per square mile. And Adirondack hunting pressure varied from three to 14 hunters per square mile of deer range, averaging 9 hunters per square mile.

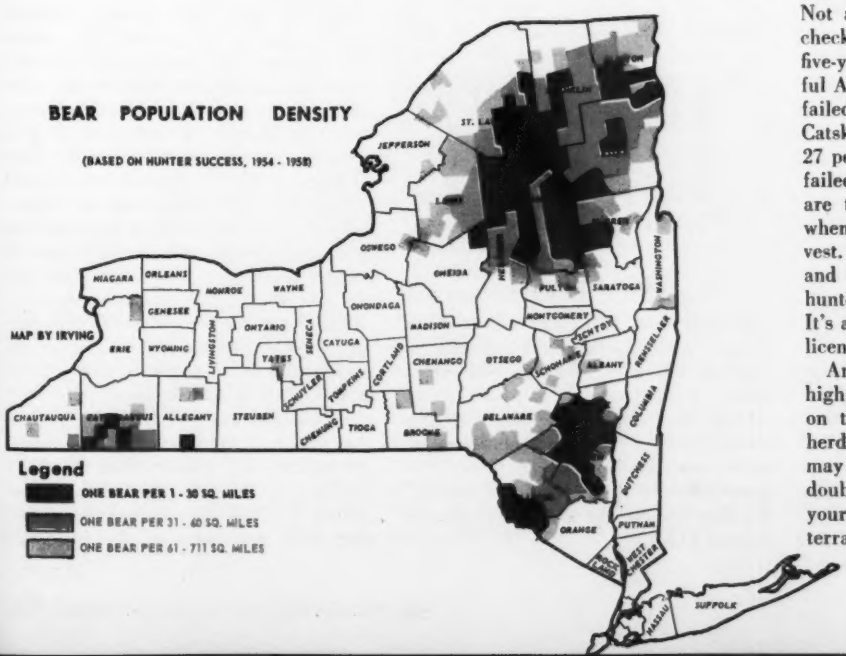
We do not have, in the case of bear, as complete information on the percentage of the population harvested by hunters annually as we do for deer, but it seems reasonable that the harvest of one bear for 34 square miles of land area with a hunting pressure of 9 hunters per square mile represents a small proportion of the Adirondack population; that the harvest of one bear for 43 square miles of land area with 24 hunters per square mile represents a high proportion of the Allegany population; and that the harvest of one bear for 34 square miles of land area in the Catskill range with a pressure of 20 hunters per square mile represents a medium proportion of the population.

Bears, of course, don't recognize or respect man-made range boundaries or county lines. Their wandering or drifting movements often take them far from their normal range and explain reports and sightings outside their principal ranges. Animals harvested in Broome and Chenango counties represent transient animals, probably wandering out of the Catskill range, and bears removed from Erie and Yates counties represent transient animals from the Allegany range. Because of the high hunting pressures around these two bear ranges, most bears wandering out of their main ranges never live to make it back to their home stamping grounds. Since 1958, however, some protection has been afforded bears in heavy hunting pressure areas by closing the season in counties not having huntable resident bear populations.

The bear population density map reproduced here shows areas of high bear concentrations. Albany, Broome, Chenango, Erie, Jefferson, Oswego, Otsego, and Yates counties were not included in the bear ranges indicated because bears shot in these counties were probably drifters from the main ranges. Forty-nine townships had a high bear abundance index of 1 to 30 square miles of land area for each bear taken per year. Forty-one townships had a medium index, of 31 to 60 square miles of land area for each bear taken per year, while eighty townships had a low bear abundance index of 61 to 711 square miles of land area for each bear taken per year.

Other townships would, undoubtedly, be included on the map if all successful bear hunters had reported their kills. Not all do, unfortunately. In fact, field checks and reviews of reports over a five-year period show that of the successful Adirondack bear hunters, 39 per cent failed to report; 25 per cent of the Catskill hunters failed to report, and 27 per cent of the Allegany area hunters failed to report. Such forgetful hunters are taken into consideration each year when calculating the regional bear harvest. But the actual reports are needed, and we again ask successful big game hunters this fall to report their take. It's as easy as dropping the postage paid license panel or card into the mail.

And here is a final tip: Most of the high bear concentration areas shown on the map also support sizeable deer herds. Why not pick an area where you may have an opportunity to score a double—both a bear and a deer? Pick your spot, familiarize yourself with the terrain before the season, and good luck.



the back of the book

Piranhas

The vicious flesh eating South American fish—the piranha—has become a subject for serious concern for conservation departments in some southern states. These fish are being sold to home aquarium hobbyists and it is feared that if they are released, accidentally or intentionally, into lakes and streams they might be able to survive and reproduce.

There are various species of these fish which can strip all the flesh from a man or animal in a matter of minutes. The fish are so voracious that they have been known to tear out the tongue of an animal that made the mistake of drinking from a stream they inhabit. If these fish were to find their way into North American waters, it could mean an end to all swimming and other recreational uses of waters where they are able to survive.

Legislation to ban importation of piranha throughout the United States has been introduced in Congress and, in addition, some state departments of fish and game are asking their legislatures for legislation to halt the importation of the dreaded fish into their states.

Sports survey

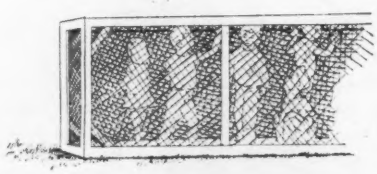
A nationwide economic survey of hunting and fishing will be conducted by the U. S. Bureau of the Census under an agreement with the U. S. Fish and Wildlife Service. This is the second survey, the first having been made in 1955, and will be conducted during January of 1961, covering the activities for the year 1960.

The new survey, like the previous one, will be financed from Federal aid funds for the restoration of game and fish. It is being conducted in response to a resolution passed by the International Association of Game, Fish and Conservation Commissioners.

Federal aid funds are derived from an excise tax on sporting arms and ammunition and on sport fishing rods, reels, creels and artificial lures, baits and flies. These funds are distributed to the various states under a formula based upon law for use on a matching basis by the states in the restoration of fish and wildlife. Thus the cost of the survey is not charged to general taxes but to the special levy which sportsmen pay through the purchase of the specified sporting equipment.

The survey, contacting some 17,000 households, will obtain such information as the number of individuals who engaged in recreational hunting and fishing in the United States during the calendar year 1960, the number of days spent in these pursuits and the total expenditures which are attributable to their participation in hunting and fishing for recreation. Any changes since 1955 in the number of sportsmen, time involved, or in the amount of money spent will be noted.

The 1955 survey showed that approximately 25 million American anglers and hunters spent nearly $3 billion in the pursuit of fish and game for recreation. This averaged about $114 apiece. The 21 million anglers spent $2 billion while 12 million hunters spent nearly $1 billion. According to the survey that year more than seven million individuals engaged in both hunting and fishing.



Live-trapped

A waterfowl trapping and banding project in Connecticut was reported, in part, as follows: "Findings—152 black ducks, 2 mallards, 1 clapper rail, 4 medium-sized boys and 1 small girl were trapped during 1958. The collection and subsequent release of the latter two items necessitated cessation of trapping." We may assume the kids were released without bands.

Beaver harvest

With New York's beaver population on the increase, seasons have been established that would give the greatest possible opportunity for trapping. This once valuable fur-bearer unfortunately is teetering on the border of economic asset for his fur or economic liability because of the damage he causes.

During 1959 and 1960, there were open seasons on beaver in 55 counties beginning as early as November 14, 1959, in some areas and extending as late as April 20, 1960, in others. Even with seasons so widespread and long, only 1,948 trappers took to the field. They harvested 9,429 pelts or an average of about 4.8 pelts per trapper.

Largest producer was St. Lawrence County with 1,697 pelts taken by 371 trappers. Next came Lewis with 1,185 pelts taken by 146 trappers, and then Hamilton with 1,180 by 150 trappers.

The overall increase from last year's take was 3,382 pelts.

Sumac

When autumn paints the countryside with patches of purple, crimson, orange and gold, there isn't a more beautiful sight anywhere than the lowly sumac tree. Scorned by lumbermen as a weed tree, and recognized even by the birds as providing only a poor quality game-food, the sumac can still hold its head up proudly in the fall, during its burst of glory.

One of the first trees to flaunt autumn foliage, the sumac often has brilliant shades of orange, yellow, purple and red on the same tree. Sometimes, only half the leaf has turned, and the other half remains a shining, rich green. The clusters of red flowers, ripened now into seed, stand erect on the branches as an added touch of flamboyancy.

In Europe, we're told, there's nothing that can even compare with the American sumac. No wonder, then, it caught the eye of the early colonists on our shores. By 1600, they must have already sent back specimens of the little tree

to friends and relatives in the Old World, because in 1596, only 104 years after America had been discovered, a celebrated Swiss botanist wrote a treatise on the species.

Actually, we have at least three different kinds of sumac here: The staghorn or American; the smooth, and the poison sumac. The staghorn is the largest and most striking. It's called "staghorn" because the new twigs are always covered with soft, velvety hairs, reminding one of the antlers of a stag when they are "in the velvet."

The word "sumac" is said by some people to have derived from Arabic. Others claim it's simply a corruption of the words, "shoemake," because at one time, the finest grades of leather in this country were cured with sumac. Both the leaves and twigs of the little tree are rich in tannin. Some of the early colonists also made a kind of lemonade from the fruits of the staghorn sumac. The Indians, meantime, were smoking the leaves! It seems that they seldom smoked just plain tobacco, but liked to blend it with other ingredients, and staghorn leaves were their favorite. In later years, country folk made home remedies for the treatment of typhoid fever out of the staghorn sumac.

Campers still prefer dried-out sumac twigs for starting their camp fires, because they burn so well and are almost smokeless. But outside of that, the wood isn't used for much of anything any more. The smooth sumac, so-called because the twigs have no velvet, is a much smaller tree than the staghorn. In fact, in many places, it's hardly more than a shrub. As for the poisonous variety, you'd better not go anywhere near it to see what the twigs are like! A relative of poison ivy, it grows mostly in swamps and is most easily recognized by its waxen white berries. Only the sap is poisonous, but if you so much as break off a flower or twig, you can get a terrible skin rash. Countless amateur botanists have learned this the hard way! In the fall, even the poison sumac is breathtakingly beautiful, with its wildly colored foliage. Just be sure to admire it from a distance.

As for the staghorn, or its smaller relative, the smooth sumac, there's no need to worry about touching it. In fact, you might try making a bouquet out of the panicles or flowers, to add a touch of autumn coloring to your home. In the winter, the deer, rabbits, and hares will relish its young shoots and bark.—ROSEMARY CLARKE, *Dept. of Commerce, Radio Bureau*

Thermo-coupled ducks

Game biologists in Minnesota are using a thermo-couple to learn more about the day-to-day and hour-to-hour habits of incubating ducks. Thermo-couples are "planted" in waterfowl nests on a duck study area and the hour-by-hour temperature of the eggs is recorded on an automatic device. The study will reveal such things as how long a goldeneye duck actually incubates her eggs, how often mallard eggs are moved about and turned, and the hourly habits of nesting hens.

W. Peer (left) and R. Emperor

Boats and people

There is no lack of evidence of need for the Conservation Department's new program in safety training for boatmen —people insist on proving the point.

Take the case of two families vacationing in the Adirondacks at Fish Creek Pond Public Campsite this summer, for example. Seven of them—five adults and two children—were cruising in a boat of the car-top variety. Seriously overloaded with some 900 pounds of people plus an outboard motor, the boat capsized. Fortunately for the occupants, Game Protector R. Emperor and Park Foreman W. Peer were in the vicinity and observed the accident. By quick maneuvering, they were able to get the women and children into their boat while the men clung to the side until more help came. One woman was unconscious and the children hysterical.

The possibilities of two families being completely wiped out were all too good.

Continuing this one day's patrol in the same area, the Conservation Department men warned 34 different boat operators of things they were doing wrong, thereby endangering their lives and the lives of others.

Multiply by some 600,000 registered power boats cruising the total navigable waters of New York and you will have a clearer picture of the need and magnitude of the boating safety program of education and patrol.

A "little" fire

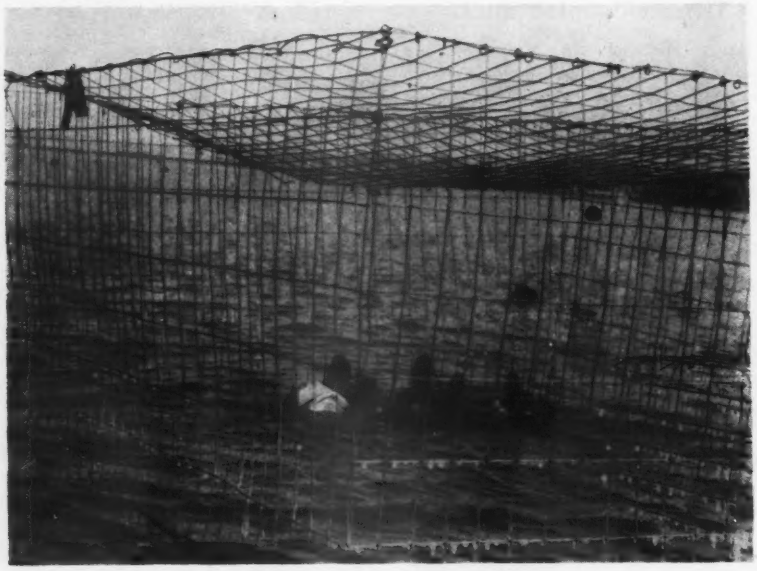
"Why did you spend $694.44 to put out a quarter-acre fire in the woods?" A good question: Because that is exactly what the Conservation Department's Bureau of Forest Fire Control did on August 30 last. At 3 A.M., lightning hit an old tree high up on the shoulder of Wolf Jaw, a 4,200-foot peak that towers over Johns Brook, in back of Keene Valley. The whole month of August had been a drouth in that area, and the woods were tinder dry, right down into the leaf-mold so that fires were burning deep into the ground and hard to put out.

The lightning strike which scattered burning wood fragments over high ledges and in blown down timber set off a blaze that, by noon, was of such proportions as to require the use of power pumps. Since the fire was 4,000 feet distant from the nearest water—the Ausable River—it had to be relayed through four pumps with connecting hose, having a gross weight of over half a ton. Anyone familiar with mountain terrain, with its steep slopes, ledges and fallen timber, knows what a major operation it is to make such an installation; and in this case it took eight hours of back-breaking labor. In the meantime, fire fighters had to reach the fire with back pumps (weighing some 50 pounds when full) to keep it under control 'till the power pumps were working.

Altogether, 52 men fought this fire for four days before it was extinguished. The Ausable Club generously donated all the food for the fire fighters and fuel for the pumps, at an estimated cost of $200. Add that to the State labor payroll and overhead one finds the costs to be nearly $1,000; a reasonable expenditure after all, to keep this very small fire from becoming a big one and possibly burning up several thousand acres of forest with its timber and scenic values. As our fire chief puts it: "All fires are the same size when they start" and it is only through the ceaseless vigilance, quick action and effective operation of the forest fire control organization that hundreds of these little fires are put out as a "part of the day's work" and never make the headlines.

Anchor chain management

Huge anchor chains, designed to keep ships from drifting, can be used on land. When dragged between two tractors, the chains do an effective job on western ranges in uprooting pinon and juniper stands, mesquite and sage to encourage growth of grass. An 180-foot length of chain composed of 46-pound links has proven to be most satisfactory.



Winter waterfowl banding

Seven banding stations operating last winter on the Finger Lakes, at Oswego on Lake Ontario, in the Niagara River in western New York, and on Long Island, captured 5,249 ducks for banding and release. Redhead ducks took number one spot with 1,967 banded; blacks and greater scaup came in second and third with 1,150 and 982, respectively.

Department game biologists have been extremely fortunate in having the assistance of sportsmen's club members and private individuals in the winter banding program. If you will note the ice formed on the trap's wire mesh in the accompanying picture, you'll see that this is more than fair weather co-operation. This year, five of the seven stations were operated by such organizations and by private parties. Outstanding co-operation was given by the Canandaigua Duck Club, Fur, Fin and Feather Club of Niagara County, Oswego Waterfowlers' Association, Seneca Lake Duck Hunters' Association, and J. J. Frey of Cold Spring Harbor, Long Island.

Fisher and otter

New York's most valuable fur-bearers, fisher and otter, are still producing good quantities of pelts despite fur prices that are not especially attractive to the trappers.

Last year, 210 trappers took 308 otter in New York, an increase of 93 pelts over the previous season. Franklin and Hamilton counties yielded the largest otter crop—51 and 50, respectively. Next came St. Lawrence and Lewis counties with 45 and 44.

Fisher produced 396 pelts taken by 195 trappers, 204 more than in the previous season. St. Lawrence was highest with 106 pelts and Franklin second with 93.

Cattail floss

The chance discovery of a nest of mice in an area just burned over by a grass fire may prove the beginning of a new industry. The discovery was made by a Wisconsin man, David Vincent, of Bemidji, who observed that the nest was made of cattail floss. He established that the reason the nest was not burned was that cattail floss has a flash point resistance of approximately 800 degrees. He also deduced that since the heat of the fire did not kill the mice, the floss must have excellent insulation qualities. In addition to its use as an insulation material, cattail floss compares favorably with kapok buoyancy and is much cheaper.

In co-operation with C. W. Bray, an agricultural teacher in the Northome High School, Vincent has succeeded in growing cattails with heads one foot long and three inches in diameter. Cattails of this size have a potential yield of between two and four tons of floss per acre every other year. At the going price of $50 per ton this could result in a cash crop of $50 to $100 per acre per year. Vincent has developed a seed germinating and planting process enabling the cattails to be grown on dry land, too.

Tumblebug watching

The mention of tumblebugs calls up childhood memories. After school let out in spring, one of the chores of a farm youngster was herding the family cows while they ate grass on the roadsides. He had nothing to do except turn the cattle around before they strayed too far and see that they did not break through fences. However, he had to stay on the job, alone, because our fathers went on the principle, "One boy is a boy, two boys—half a boy, and three boys—no boy at all." Passing wagons, buggies and, rarely, a chugging automobile, added momentary interest. With such limited sources of amusement, it is not surprising that many of us became tumblebug watchers.

A "tumblebug" is a beetle, not a true bug. It is a nickname for those kinds of dung beetles which mold, roll away, and bury balls of dung on which they feed. In some they lay eggs and rear their young. The best-known kinds are those which make balls from fresh cow or horse manure. Other species roll the ready-made, pellet-like droppings of rabbits, sheep and deer. Since these balls are often rolled considerable distances over grass and bumpy ground, both ball and beetle take many a tumble.

The tumblebug is built like a bulldozer—a big, black, robust insect with stout legs fitted for digging and a blunt shovel-like beak used in shaping the ball. In rolling its "marble" the beetle faces backward and almost stands on its head as it pushes with the hind legs while the forelegs are braced against the ground. These balls are rolled, buried and eaten, one after another, until late summer when the female buries a few special pear-shaped balls in each of which she lays a large, creamy white egg. From this egg hatches a C-shaped grub, or larva, which feeds and grows until the ball is a hollow shell. After passing through a resting, or pupa stage, the new adult tumblebug breaks out, usually after a rain, and digs its way to the surface.

The sacred scarab of the ancient Egyptians is a dung beetle of the Mediterranean countries. This insect has figured importantly in their art and religion for thousands of years. The ball, which the beetles were supposed to roll from sunrise to sunset, symbolized the earth, and the beetle, itself, the sun. As an emblem of eternity, it was placed in tombs with their dead and its image carved in stone and precious gems. Because it disappeared into the soil and afterwards reappeared, it stood for resurrection. Later, Roman soldiers wore scarab seals set in rings to bolster their courage.

One of the finest and most interesting descriptions of the habits of any animal was written about the sacred scarab by the great French naturalist, Jean Henri Fabre. Scarcely more than an inch long, this beetle shapes a hard compact ball which may be as large as a small apple or a man's fist. He showed that dung-burying beetles of many kinds and sizes play an important part in fertilizing the soil as well as in sanitation. In some cases, enormous quantities of manure are buried promptly without being eaten. Fabre recorded an instance in which a dozen inch-long beetles of another kind each buried 60 cubic inches of manure night after night. This habit prevents the development of several manure-breeding flies and other pests.

The scarab family of beetles, over the world, has 30,000 known species. Their large sizes, bright colors, and unusual shapes make them favorites of amateur collectors. The males of many kinds have knobs or horns with which they butt and ram each other until one gives up.

Locally, the horseless carriage was the doom of the tumblebug.—NATURE BULLETIN, *Forest Preserve District, Cook County, Ill.*

Indian trail tree

The road directional signs of today are so numerous that it's sometimes a puzzle to know which way to turn, especially with many lanes and high speeds.

It wasn't always so. Some of our first route markers were established by the Indians to mark their trails. They were few because the Indians had little use for trails as well worn as ours but some of their markers endure to this day. They were saplings in Indian times which the Indians bent, broke or trained to grow in a form to create a trail pointer.

Here is a picture of one in Allegany County, estimated to be 250 years old and, barring the woodman's axe or nature's accident, it will endure for many more years to come.

Private campgrounds

The increasing number of family campers in the United States has taxed the national and state areas to the point where many families are turned away. Catering to their demand, a relatively small outlay can enable the private landowner to make a reasonable profit.

The Camping Council of 17 East 48th Street, New York 17, N. Y., puts out an informative kit entitled "How to Make Money with Family Campgrounds." The price is $1. Distinction is made between transient campgrounds and recreation campgrounds, and the kit gives cost estimates and working drawings of required installations in each type of campground. Established enterprises which could add a campground and supervise it with very little extra effort are listed as farmers, roadside gas stations, stores or stands, or motels. Twenty campsites or less would provide extra income. If the campground is to provide the sole occupation during the summer, "one operator with several members of his family or with the help of two or three high school or college boys can easily supervise a hundred campsites."

Estimated cost of setting up a campground with 20 sites is $1,700, not inclusive of the land. With campsite fees figured at $2 a night, the gross revenue for a 10-week summer period is estimated at $1,600, at 60 per cent of capacity.

Pollution reports

Fisheries or conservation agencies in all but nine states have agreed to cooperate with the U.S. Public Health Service in a new nationwide system of reporting the frequency and location of fish kills. Information on numbers, locations and causes of fish kills already is coming in to the Public Health Service and the first of regular quarterly reports will be issued soon to Federal and state agencies concerned and to the general public.

Reports on fish kills are another means of obtaining basic data requested to determine full effects of pollution on the nation's water resources.

Life spans

The box turtle has been known to live 123 years and giant tortoises 152 years. Swans have been known to live 102 years and parrots for 80 years. The great horned owl has a long life span; one kept in captivity lived for 68 years. Chipmunks have been recorded at 12 years, squirrels for 16, beaver for 19, mountain lions for 20, grizzlies for 32, and buffalo for 30 years.

Conservation award

Michael Rodak, Conversation Aide, from the Conservation Department's Game Management office at Poughkeepsie, received the Robert G. Ohlman Award at the 1960 annual banquet of the Putnam County Fish and Game Association.

This award, given in honor of the late Bob Ohlman, former District Game Manager in Poughkeepsie, is made each year to the person who the selection committee feels has accomplished the most for conservation in Putnam County during the preceding year. Mike, who did much of the work in setting up the Fish and Wildlife Management Act controlled public hunting area in that county, was the choice of the committee for 1959.

In view of the tremendous amount of work Mike Rodak has done for the cause of conservation, the award, in the estimation of fellow members of the Department, could not have gone to a more deserving individual.

Shooting preserve directory

More than 300 places to hunt are listed in the 1960-61 National Directory of Shooting Preserves. The free and handy pocket-sized folder names the public shooting preserves, indicates counties in which they are situated and lists telephone numbers. It also describes what hunters can expect at the preserves by way of upland game and waterfowl and lists services and facilities.

Leading sporting goods stores in the 41 states where preserves may be operated should have copies of this handy folder. They may be obtained from the Sportsmen's Service Bureau, 250 East 43rd Street, New York 17, New York.

Foreign foresters

Some forty forestry leaders, representing twelve foreign countries, visited installations of the New York State Conservation Department while on their way to the Fifth World Forestry Congress being held this year in Seattle, Washington. Members of the group represented Brazil, Burma, the Belgian Congo, France, Germany, Ghana, Indonesia, Italy, Liberia, Philippines, Rumania and Sweden.

The purpose of the tour, which covered 850 miles through New England and New York, was to show the visitors the extent and variety of forest land still remaining in the oldest settled and most populous section of America.

The group spent five days in New York visiting the Saratoga forest tree nursery, the largest in the world; the Saratoga national historical park where an extensive acreage is being managed for historical and recreational use, and county, State and private forestry operations. Next on the tour came a visit to the paper mill of Finch, Pruyn and Company in Warren County; the Glens Falls municipal watershed lands; the Lake George Beach and Battlefield Park and the New York State College of Forestry's Pack Demonstration Forest at Warrensburg. By mid-week the group had visited a sawmill of The Northern Lumber Company at Riparius and made an extensive tour through the Adirondack Forest Preserve with visits to State campsites and installations to show the program for recreational development. Next, came a visit to the Speculator tree farm of the International Paper Company and a discussion of national forests in the Northeast and their place in the regional economy.

At Syracuse University, the group toured the College of Forestry's Marshall Hall where they were shown programs in teaching extension and research in landscape engineering, botany and wildlife management. At Baker Laboratory, they learned of programs in wood products engineering and forest chemistry and then visited the College's pulp and paper mill for the latest developments in pulp and paper engineering.

The last stop was at Albany where the group had a chance to see the administrative facilities of a State Conservation Department in action and visit with key people involved in managing New York State's lands and forests; fish and game; parks; water resources and the conservation education program. This included a visit with Commissioner Harold G. Wilm, a visit to a wildlife exhibit, a game farm and a wildlife research laboratory.

Certainly, after such a tour, this group of foresters had an excellent chance to see "multiple use of forest lands" in action—the theme of the World Conference which they attended the following week.

The Congress, the first ever held in the United States, was host to foresters from 71 nations, including 700 foreign participants and with United States delegations, it is expected the attendance will top 2,000.

Food and cover

Biologists inspect initial success of food and cover plantings made on District 13's Putnam County Co-operative Public Hunting Area in the spring of 1960. (Left to right) Warren McKeon, Department Representative to District 13; William Hollister, Conservation Biologist, District 13; Dr. E. L. Cheatum, Assistant Director, Division of Fish and Game. Several such plantings have been established on this 1,100-acre area.

Parts per million

The term "parts per million" used to be strictly scientific jargon, but lately we see and hear it referred to much more often. It's a common reference when speaking of the amount of chlorine that makes our water safe to drink, or sometimes the amount of herbicide or pesticide that may make our food or drink unsafe.

The NAC News and Pesticide Review has offered some interesting comparisons that may help some to better understand this unit of measurement. Here are a few examples of what "parts per million" could mean: One crystal of granulated sugar in five pounds, one drop of water in 160 gallons, one penny in $100,000, one inch in 158 miles, the thickness of a sheet of cellophane compared to the height of the Washington Monument.

Bald eagle notes

The young of the bald eagle leave the nest when they are about 13 weeks old. Average weight of the adult bald eagle is about 11 pounds. This species does not develop its white head plumage until nearly three years old. They mate and use the same nest for life. The nest or eyrie of bald eagles is made of sticks located on a pinnacle or tall tree. The eyrie may be as much as 20 feet high and from 4 to 6 feet in diameter. Incubation period for the eggs of the bald eagle is approximately 35 days, and both the male and female eagle help to incubate the eggs.

Skeet

Skeet shooting is an American invention, followed throughout the world but with its greatest popularity in the United States. There is no better way for a hunter to get his "eye" in shape and get used to his gun prior to the hunting season than shooting a few rounds of skeet.

The sport was developed in this country about 1910 and the word skeet itself is an archaic Scandinavian word for shoot. The average skeet squad is composed of five people each of whom shoots a round of 25 shots.

The skeet field is laid out in a semi-circle (or half-clock) with eight stations for shooting. Seven stations are positioned at equal distances on the perimeter of the "clock" with the eighth in the middle on a line between position one and seven. Station one would be the numeral 12 on a clock; position seven would be the numeral 6. High targets are thrown from station one at one end of the semi-circle and low targets from station seven at the other end. The trap houses at station one and seven are called the high house and low house. Targets are always thrown in the same pattern of flight, but the angle of the shot varies because the shooter changes positions as the skeet squad moves from station to station. Two targets are shot from each of the eight stations—one from each house.

Doubles, where targets are thrown simultaneously from both houses, are then shot from stations one, two, six and seven. The 25th shot is called optional, for it is a repeat of the first miss. If the shooter breaks all of his first 24, he can call for a target from any station or house as his optional shot.

Skeet is shot over competitive fields of precise, constant specifications under rules issued by the National Skeet Shooting Association.

Try it, and improve your shooting and your game bag.

Marine research

The first marine game fish research center of the Bureau of Sport Fisheries and Wildlife has been established through a co-operative agreement with the Department of the Army. A former base hospital at Fort Hancock on Sandy Hook, New Jersey, has been made available to the Bureau as a laboratory.

The new research center is located in an area of intensive marine sport fishing for such species as bluefin tuna, striped bass, flounder, weakfish or sea trout, mackerel and scup or porgy. It is convenient from the standpoint of travel and communication to Atlantic coastal game fishing centers.

A staff of nine scientists is expected to operate out of the new research center to study the basic life history of important marine sport fishes and the effects that environmental factors have on abundance, distribution and general well being of the various species. An inventory of salt-water sport fishing, its extent, facilities and harvests will also be conducted.

Public Law 86-359 that became effective September 22, 1959, calls for a comprehensive, continuing study of the migratory marine fish that are of interest to recreational fishermen of the United States, including species inhabiting the offshore waters and species that migrate through or spend a part of their lives in inshore waters. This is one of the first steps in this important program.

Diamond anniversary

The U.S. Fish and Wildlife Service has, this year, celebrated the 75th anniversary of the Federal government's entrance into the field of wildlife research. The field of wildlife research and management, now vested in the Bureau of Sport Fisheries and Wildlife, had its inception in 1885. During that year the 48th Congress appropriated $5,000 "for the promotion of economic ornithology, or the study of the interrelation of birds and agriculture."

Thus began the Bureau of Biological Survey, and after achieving a worldwide reputation for leadership in the handling of wildlife conservation problems it was merged in 1940 with the former and companion Bureau of Fisheries to form the present Fish and Wildlife Service.

In the words of Secretary of the Interior Fred A. Seaton: "Wildlife administrators of today are deeply indebted to those pioneers who started out in 1885, in what was practically a virgin field, to find out all they could about the various species of wildlife, and their requirements for survival."

Releasing turkeys in the Catskills

Turkeys gain

Like deer, beaver and bear, the wild turkey is learning to live with people. He's on his way back in substantial numbers in many an area where once he was thought to be gone forever.

Recently, more than 90 persons, representing 26 state game departments, the U. S. Fish and Wildlife Service, universities, industries and private conservation organizations, attended a symposium to discuss the biology and present status of the wild turkey and techniques for its improved management and continued restoration.

The proceedings, including distribution information, reports on harvesting methods, biology and population dynamics, restoration attempts and research needs, supported by charts, maps and graphs, are now available from Fred Hardy, Turkey Subcommittee Chairman, Department of Fish and Wildlife Resources, Frankfort, Kentucky. More than half of the scheduled printing of the proceedings already has been sold. Paper bound copies of 210 pages are available at $3.50 each.

Wildlife workers now are really optimistic about wild turkeys. In 1948 only three of 17 states reported the birds on the increase, with a total population of about 129,000. Now, it's estimated there are about 460,000 wild turkeys in the continental United States. The eastern and Florida races of the turkey have increased more than 100 per cent since 1948. More of the turkey's historical range is occupied, and 18 states report successful restoration projects, including some areas well outside the original known range of the big birds.

Jet age ducks

We hear and read more often of man's air space problems in the jet age; ducks are feeling the impact, too.

Flights of ducks fly very low as Sabre jets streak down in simulated attacks on Primrose Lake, site of an RCAF base at Cold Lake in northeastern Alberta. Other flights flare and panic as CF-100 jet interceptors whistle across the Beaver River for landings at the base. But the birds are determined to learn to live with their noisy brethren, for they persist in using the area.

Lesson for litterbugs

There are a few hunters and fishermen who are destroying hunting and fishing opportunity as fast as fish and game people can promote it. They are the "litterbugs."

New Hampshire officials made a bold move toward curing it. They have a law which provides for revocation of a person's hunting and fishing license if he is found placing or throwing refuse or rubbish into any public waters, onto the ice of public waters in the winter, or on land bordering the public waters.

OAK ORCHARD GAME MANAGEMENT AREA
RETRIEVER TRIAL GROUNDS
Established by the N.Y.S. Conservation Department in a cooperative effort to promote the development and use of better hunting dogs

National Amateur Retriever Trial

Another first in field trials for the Conservation Department came in June with the fourth running of the National Amateur Retriever Championship at the Oak Orchard Game Management Area in Orleans County.

The grounds at Oak Orchard were judged as excellent with miles of dike roads skirting controlled water level marshes, and with adequate upland areas for land retrieves.

Sixty dogs were qualified to compete and the home kennels of the starters represented sixteen states from coast to coast. Of the 60 dogs that qualified, 11 came from the Eastern Coast Zone; 17 from the Central Zone; 7 from the Mountain Zone, and 25 from the West Coast Zone. Unfortunately, only 36 dogs were finally started, but as in previous trials, all dogs were handled by their owners and this provided the friendly rivalry of a "fun trial." Winner was *Queenie of Redding*, a female Labrador owned and handled by Rolland Walt of Redding, California.

From the point of view of popularity, the Labradors outshone all other retriever breeds. Of 36 starters, 32 were Labs, three were Goldens, and one a Chesapeake. The average age of the competing dogs was six years and four months.

Scout conservation project

The Scoutmaster of Troop 56, Port Byron, was looking around for some useful conservation projects for his boys and came to nearby Howland's Island Game Management Area for some help. A new type duck nest box that would be safe from predators and could be used by other types of ducks besides the wood duck was ready to make and set up. Half of one pond near the lodge was set aside for the Scouts to use in putting up these new type boxes. The boys worked hard for several weeks making the boxes and spent two week ends cutting holes in the ice for the posts that would hold them. They placed the boxes on the posts and added the nesting materials. Unfortunately, there was a bad icing condition during the spring breakup and some of the boxes were uprooted. but the remaining boxes more than made up for this circumstance. Their labor was well rewarded with three broods of mallards and two broods of wood ducks.

This conservation-minded Troop also spent a week end on the Island in mid-April planting more than 500 trees and 350 shrubs for wildlife.—R. V. BAUER, *Refuge Caretaker*

Conservation films

"A Critical Index for Films and Filmstrips in Conservation," is a helpful publication for teachers seeking reference materials. It is compiled and edited by the Audio-Visual Department of The Conservation Foundation, and deals with renewable and non-renewable resources, and with new and to-be-developed resources.

The Index includes a description of each of the films and filmstrips that the department has found to maintain a high standard of production, ingenuity of presentation and concept. Copies of the booklet may be obtained without charge from The Conservation Foundation at 30 East 40th Street, New York 16, New York.

Radioaction monitors

Five air monitors designed to measure radioactivity will be in operation soon at the following locations in New York State: Johnson City water treatment plant, University of Buffalo, Watertown water treatment plant, Suffolk County Civil Defense headquarters at Yaphank, and the Peekskill water treatment plant.

These monitors will be used to determine variations in background radiation stemming from nuclear fallout from weapons testing or local sources of air contamination. Each monitor consists of a vacuum air pump, special filter paper to remove air-borne particles, a detecting device, electronics system and meters. The detecting device is located directly below the area of the filter paper on which air borne particles are collected. Any excessively high levels of radioactivity of such materials will immediately set off an alarm.

New York will be the first state to have such a monitoring system. Its purpose is to keep health personnel constantly informed of levels of radioactivity, for whatever action may be necessary.

Recreation needs

The Executive Director of the Outdoor Recreation Resources Review Commission recently pointed out that recreation could be considered as another income crop from land.

The O.R.R.R.C. is concerned with finding out what Americans now require for outdoor recreation and anticipating their needs for the future. New recreational demands from an increasing population enjoying more money and leisure time are anticipated and private lands can play an increasingly important role in the nation's outdoor recreation picture.

But if private lands are to be made an effective and widespread part of the national recreation resources, a plan for fairly compensating the landowner or at least protecting him from property loss or lawsuits for injuries suffered on his land, is a must.

Plantation pay-off

What may have been the first commercial harvest of plantation grown Norway spruce occurred this year during the month of June in Forest District No. 14 on the woodlands of Dieterich Farms. a Dutchess County Forest Practice Act co-operator.

While in the process of completing a woodland improvement contract on Dieterich Farms. St. John's Forest Products, Inc. of Hopewell Junction received a purchase order to supply 100 Norway spruce piles some 55 to 64 feet long. Additional requirements included a minimum top diameter of 6 inches and a minimum butt diameter of 12" at 2 feet from the large end.

This material was available in a 66-year-old plantation on Dieterich Farms, whose woodlands are managed under the joint auspices of the Forest Practice Act and a Consulting Forester, John Stock, of Tupper Lake. The company contacted Mr. Stock and executed a contract to purchase 100 trees at a bid price of $6 per tree. Now came the fun for the FPA forester—selecting the trees to be cut. Anyone know a good way to "quesstimate a 6-inch diameter at 64 feet off the ground when the trunk is partially obscured by green branches?

Circumferences, breast high, had to be kept between 37 inches and 48 inches to insure sufficient height in relation to top and butt specifications and to guard against "giving" more wood volume than was necessary. The average diameter breast high of trees selected came to 13 inches, which converts to 157 board feet per tree. Another way to look at this transaction is by the stumpage price of $38 per thousand board feet. Approximately three acres were covered in what constituted a light thinning of co-dominant trees. The plantation scarcely looks disturbed.—FRED W. OETTINGER, *Forester, District No.* 14

Workshop anniversary

When 50 sportsmen-leaders met this past June on Long Island for the 1960 session of the New York State Sportsmen's Conservation Workshop, the occasion marked the tenth consecutive year the event has been held. Appropriately, time was taken during the session to celebrate and to reflect on accomplishments.

Michael Petruska of Troy, current President of the New York State Conservation Council, related how it all began a decade ago. After observing the initial success of a Teachers' Conservation Workshop, which Cornell University was conducting under Council sponsorship, officers of the organization decided to call on the University to launch a similar session to develop a corps of better informed leaders among the organized sportsmen of New York State. The bid was accepted, and the initial session convened in 1951 at the University's Arnot Forest. The event has been a going and a growing concern ever since.

In these ten years, the Workshop has been attended by 216 different sportsmen from 43 counties. Since a new program in a different setting is featured each year, repeat attendance is encouraged. A most heartening result has been that almost half of the participants—102 of them—have returned for two or more sessions; 66 have attended three or more years. At the top there is a group of 20, all Council delegates or officers, who have attended five or more workshops.

The three "veterans" pictured here inspecting some marine oddities have outstanding attendance records. Stephen O. Gehring, (center) of LeRoy, Genesee County, is the only person who has attended all ten meetings of the New York State Sportsmen's Conservation Workshop. Herman Forster, (left) of the Bronx, has been present 9 years, and James P. Long, Naples, Ontario County, is among the five who have attended 8 years.—HARLAN B. BRUMSTED, *Extension Conservationist, Cornell Univ.*

Duck predictions

According to surveys by the U. S. Fish and Wildlife Service, duck flights in the Atlantic flyway are expected to be about the same as in 1959, with the exception of redheads and canvasbacks which are still in serious trouble—serious enough, in fact, so that the Service has placed them on the protected list this year.

Atlantic flyway hunters can be encouraged, however, by an estimated 20 per cent increase in the black duck population over last year.

Because of the lack of well-developed surveys in the important Quebec-Labrador breeding area, it is not possible to place the same reliance upon breeding ground data in predicting Atlantic flyway flights as on the other flyways. From the data available, there is little reason to expect an increase in production this year. Breeding areas in the prairie provinces and the Northwest Territories which supply the bulk of the mallard, pintail, teal, and canvasback started off the current season with a reduced breeding population. No change is expected in the flight of Canada geese and brant, both exceptionally good last year, and there will probably be a slight increase in the coot flight.

Buffalo, anyone?

Whether it is wild game or domestic livestock, a range will support just so many animals and each year the U. S. Department of Interior must dispose of excess big game animals from its refuges by sale.

Live elk under two years of age are available for $90; live buffalo under two years for $150. Longhorn cattle, including some fine specimen steers, are sold at public auction. For $50 someone who has a craving for wild game meat can get half an elk or $100 for a whole one. Half a buffalo sells for $90 and a whole one for $180, and there are a few quarters of buffalo available at $45 each. Purchasers must get their orders in early and all orders are handled on a "first come, first served" basis.

Live animals will be delivered to the purchaser's truck at the capturing corral; butchered animals will be delivered to the purchaser's truck or to a transportation company. The animals available by refuge are: Wichita Mountains, 130 buffalo, 120 elk, 93 longhorns; National Bison Range, 81 buffalo; Fort Niobrara, 32 buffalo, 7 elk, 33 longhorns; Sullys Hill, 6 buffalo, 8 elk.

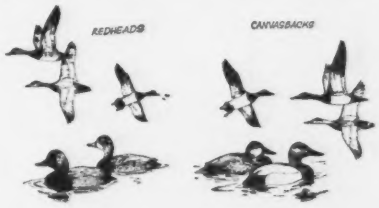
The official price list and conditions of sale can be obtained from the Fish and Wildlife Service, Department of the Interior, Washington 25, D. C., or from the manager of anyone of the four refuges. Orders must be placed directly with the manager of the refuge most convenient to the purchaser.

Takes courage

A game warden faces more armed men in the course of his duties than any other law enforcement officer. This is because he is called upon to check hunters with loaded firearms hundreds of times annually.

Refuge

Nearly 10 million visitors (humans) "took refuge" at the National Wildlife Refuges in 1959, a record breaking total.



Can's and Redheads — No!

Don't forget—there's a closed season on canvasback and redhead ducks this year.

Game biologists are hopeful that hunters will be extra careful this year in holding their fire until they can positively identify the ducks they are hunting. It will pay!

First, the hunter can save himself embarrassment and a fine which he is sure to get if he is apprehended with either of these species in his bag.

Second, he can do a job of conservation in saving every possible canvasback and redhead for breeders this coming year—and their populations are at a seriously depleted level right now. They are too fine a game bird to lose.

Third, he can be sure of more legal ducks in his bag and fewer cripples if he waits until any birds are close enough for positive identification.

Letters to the Editor

Rabies in bats

Dear Editor: Reference is made to the item, "Bats and Rabies," published under Letters to the Editor in your August-September, 1960 issue of THE CONSERVATIONIST.

While it is true that the chances of getting rabies from bats is remote, recent developments indicate that the possibility does exist and should be carefully weighed by persons bitten or otherwise exposed to bats. Since rabies in insectivorous bats was first recognized in September, 1953, the disease has been reported from at least 25 states including New York. In this State, bat rabies has now been diagnosed in Rensselaer, Queens, Rockland, Allegany and Saratoga counties. It is entirely possible that the disease may be more widely prevalent than recognized.

Within the past few years approximately 400 human exposures to bats have been recorded in the United States. Thus it appears that the incidence of bat bites is increasing not only in New York but in other areas as well. There have been several cases of rabies in man following exposure to bats.

Most mammals which develop rabies are capable of transmitting the disease only while ill or at most for a few days prior to the onset of illness. Bats, however, have been shown to excrete rabies virus in their saliva for weeks and months without showing signs of illness. Recognizing this fact the Public Health Council amended the New York State Sanitary Code in December, 1955 making bat bites reportable to the health officer and stating that biting bats are considered to be presumptively rabid until proven otherwise by laboratory examination.

While we do not wish to alarm the public, anyone bitten by a bat should immediately contact a physician.

Importantly, all animals exhibiting abnormal behavior or biting humans or other animals should be submitted to the laboratory for examination. By studying such animals we will be able to more adequately determine where and to what extent bat rabies exists in this State.

Donald J. Dean, D.V.M.,
Div. Laboratories and Research,
N.Y.S. Dept. of Health

Blue frog

Dear Sirs: My parents have a farm pond at Varysburg. It is well populated with ordinary green frogs. However, we have one frog which is the brightest blue in color. Many people have seen it. Neither they nor we can explain why it should be different. We have taken movies of it. My father has been an ardent subscriber and reader of THE CONSERVATIONIST magazine. He says if you want to know anything about nature call on THE CONSERVATIONIST. Why is this one frog blue? Is this common? Thank you.

Sandra Eggleston, Varysburg

• *Mindful of our responsibility to know things about nature, we held a caucus of frog observers hereabouts and learned that not one of us had ever seen a bright blue frog. We think maybe it's a color mutation, which means it's a little mixed up on heredity. We hope it will fare well and carry on. Blue frogs, we think, would perk up the pond very prettily.—Editor*

No collector

Gentlemen: As a consequence of the recent notice in THE CONSERVATIONIST respecting my inquiry for a Gunter's chain. I have been approached by a couple of parties who had Gunter's chains they were willing to sell but had no idea of their value as "collectors' items." I believe an erroneous impression has risen in regard to these chains being "collectors' items."

Gunter's chain was invented back in 1623 by Edmund Gunter. They survived in use for a bit over 300 years—and then it took a war to halt their production. Thus during the war, perhaps around 1941, their manufacture ceased in order to produce essential items and since then probably haven't been made. Gurley at Troy has some still in stock but these are metric or in Spanish varas.

I have not doubt whatsoever that a Gunter's chain dating back to 1623 as made by Gunter would indeed be a real collector's item. Even those dating back a 100 years, but to place all Gunter's chain, whenever made, into the class of "collectors' items," would be placing a false value as well as the wrong impression into some people's minds.

Personally I am not a "collector" nor am I seeking any collectors' items—I wouldn't know a genuine Gunter's chain from a Grumman chain! I have a practical use for a Gunter's chain for the purpose it was intended—as a standard of measure. No doubt Gunter's chains have become old-fashioned in the modern world of surveying where tension handles and thermometers are necessary in chaining with tapes.

But worse yet is the false values created in the minds of some people who suddenly find themselves with "collectors' items." It may be that Gunter's chain is on the road to becoming a "collector's item" but much depends upon its condition, who it was made by and when. Don't need one so badly that I'd pay a collector's price for one!

A. Walton, San Diego, Calif.

Hump-backed perch

Gentlemen: While trout fishing in the Cassadaga Creek near Cassadaga, New York, I caught this unusual looking perch which I thought might interest you.

Harold Brinkman, Silver Creek

• *As to the yellow perch you caught in Cassadaga Creek, the following from J. R. Norman's "A History of Fishes" (New York, Frederick A. Stokes Co.) about fits it: "Hump-backed or hog-backed specimens, with the vertical column shortened, curved or otherwise malformed, occur among marine and fresh-water fishes. Such individuals do not appear to be necessarily unduly handicapped in the struggle for existence, often attaining to a fair age, and generally appearing well nourished."*

Numerically such abnormalities are likely to be very scarce although recent research on trout egg development indicates that some abnormalities are very frequent under conditions such as low oxygen and unusual temperatures during development.

Your co-operation in sending this unusual photo is much appreciated.—John R. Greeley, Chief Aquatic Biologist

Any-deer season

Dear Sirs: I have often heard this question and discussed it myself many times with everyday deer hunters, high class hunters and guides of the great Adirondacks and the Catskills, and it seems that 70 per cent or more are in agreement: Why doesn't the State of New York consider a one-deer (of-either-sex) season instead of buck only; than have to follow up with a special doe season? The season could be shortened to comply with the size of the herd and would surely save ever so many slain does which are shot during buck season.

You and everyone else know this is being done every buck season by hunters who just don't seem to care. If the count could be taken, it would no doubt run into the hundreds or more. This past fall I saw two does in one spot and seven throughout the season, shot during buck season and left to rot.

I know that the average deer hunter does not know or understand all the vital points of conservation, but a great many of us would like to read your views on this question. Many other states have this type of season and it seems to work with wonderful results. We believe it could work in New York State too.

One thing more: Why don't we have stronger laws to prevent "accidental" shooting fatalities in the woods (perhaps a charge of manslaughter or even life imprisonment)? This would surely keep the happy shooting and sound shooters from shooting until they know for sure what they are shooting at.

Many of my friends and I have been hunting deer for more than 25 years and have some idea of the many problems facing the Conservation Department. Since we are all interested in better conservation and better hunting, let's work together toward this goal.

Floyd Plowinski, Albany

• *Experience, particularly in the Southern Zone areas of the State, has shown that a straight "any-deer" type of season would be too severe because of the great number of hunters we have in New York State. Our records indicate that if we were to hold this type of season annually, we would definitely cut too deeply into the breeding stock, thereby reducing the herd well below the capacity of the range. Over the years, and with a continuing season of this type, fewer deer would be available to the hunters; production would be greatly reduced.*

If we had a short any-deer season, it is possible that in some areas the same condition would result. In addition to this, a short two-to-three-day season would have other and serious disadvantages. Of greatest concern, during such short seasons, are the very great concentrations of hunters that occur. Experience during recent years has demonstrated that this type of hunting pressure creates widespread adverse public sentiment among sportsmen and landowners alike, and results in increased posting against hunting. Another consideration to bear in mind is the obligation to provide a maximum amount of recreation for our deer hunters. This is not accomplished by short open seasons.

The last session of the Legislature enacted a bill which provides for the taking of deer-of-either-sex by use of party permits. This would entitle a given party of hunters to a deer over and above the deer that they individually are entitled to under their regular licenses. This extra deer could be a deer-of-either-sex and the permits could be made valid throughout the regular deer season. By utilizing this Legislation we feel the number of deer left in the woods and wasted will be substantially reduced. The party permit system will be in effect this season (see CONSERVATIONIST, *August-September, 1960) and we have great hope that it may be the answer to our deer management and harvest problems in this State.—A. G. Hall, Chief, Bureau of Game*

An exception

Every blue moon or thereabouts we take a deep breath and publish a picture submitted by a reader showing a trophy brought to bag or creel. Our hesitancy is, we think, understandable. Nothing is less inspiring to others than pictures of people they don't know standing in front of, behind, to the right, to the left or northeast of a string of very dead, sunbaked trout, or southwest of an equally dead, glassy-eyed bear.

Well, the moon is blue and having breathed deeply, here, pictured above, is Otto Mathis of West Leyden, with a deer he shot last fall while hunting in the Tug Hill country. The deer, as one can readily see, was a 7-pointer and, as cannot so readily be seen, weighed 182 pounds.

So what? So, in the first place, the deer is (or was) a doe and that's about as fine a set of antlers, polished at that, as you will ever see a doe sporting around. When they do grow antlers, infrequently, they are pretty feeble excuses for the racks toted about by the bucks. Secondly, when you stop peering at the doe's antlers, take another look at Otto, the successful hunter, and let us ask—have you ever seen anyone more pleased and happy over the whole situation?

Looking at the picture makes us feel better; we hope it's general.—Editor

Dead trees and woodpeckers

Dear Sir: Concerning the letter about downy woodpeckers doing damage to a building, in the June-July number of THE CONSERVATIONIST, may I suggest that the cause of this trouble is the lack of dead trees or dead limbs in which the woodpeckers can drill sleeping or nesting holes. Foresters consider that using up dead trees is good utilization, and tree surgeons want to cut off all dead limbs. Perhaps that is also the reason why, a few years ago, pileated woodpeckers drilled holes in telephone poles.

Some years ago I owned a house that had been built in a forest area. There were thirty species of trees on the area, the largest being red oaks. There was one dead oak tree and dead limbs on several trees. One of these limbs was used by a downy woodpecker as a place to drum. A man representing tree surgeons came around one day and wanted me to let him trim the dead limbs off and cut down the dead tree and he seemed astonished when I didn't want it done. Removing dead trees and limbs is not, in my opinion, good conservation.

Aretas A. Saunders, Canaan, Conn.

Mighty oak

Dear Sir: In March of this year, I finally took a circumference measurement on one of two large white oaks that have interested me for some time due to their unusual size.

These two trees of about equal size are located on the grounds of the Passionist Fathers on Palisade Ave., in Riverdale, the upper western portion of Bronx County in New York City. They are on a sharp slope overlooking the Hudson River and about 600 yards apart.

Three feet from the ground on the base of the lowest tree on the slope and using a 50-foot steel tape, I found the circumference of this tree to be 22 feet, 8 inches.

I would appreciate your opinion as to its size and/or a rundown on averages for this type of tree.

Harry Trowbridge, Bronx

• *According to your letter, the circumference of one of these trees at 3' above ground level is 22.8 and your inquiry requests a rundown on averages for this species of tree. We have done some research on this and find that Harlow and Harrar report that white oak at its best grows from 80' to 100' high and 3' to 4' in diameter. They also report that the maximum reported is 150' high by 8' diameter. According to a 1941 report from Maryland, a white oak was found in that state to be 27'8" in circumference and 95' high. Still others have been reported at Hyde Park, New York, one having a circumference of 17'3" by 70' high and another having a 13'8" circumference by 70' high.*

From these statistics, you can see that the tree you measured is truly a "big tree." We will have one of our foresters look at these specimens some time in the future and remeasure them at the standard breast-high point, 4½' above the ground, for our records.

May I again express our appreciation to you for making this information available to us.—C. F. Baar, Superintendent, Forest Investigations

Hazelnut

Dear Sir: I'm sending a part of a tree or shrub and also the fruit it bears in order for you to give me some information on it. (1) I would like to know the name of this tree or shrub and if it is a native to this part of the country or was it brought here from somewhere else? (2) I would like to know when this fruit or nut is ripe; is it good to eat? (3) I would also like to know if this is good to eat: what is the proper way to grow another from this? From the nut itself or from a shoot?

Ronald Stephen Rose, Valhalla

• *The leaf and nut specimen you sent us have been identified as the American hazelnut* (Corylus americana) *sometimes also called the American filbert. This is a native shrub found in eastern United States from New England to Georgia. The fruit is edible but generally scarce, except where cultivated, as the nut is a favorite of squirrels.*

Although the propagation of this plant is difficult from seed it has been partially successful if the seed has been stratified for a period of at least 90 days. This means that the seed is to be kept covered in layers of moist sand at a temperature of 41° F. or less for the period. The seed is then sown in the spring. If stratification is not possible fall sowing is recommended.

Generally this plant is propagated vegetatively from cuttings, by grafting or by layering or by sprouting. Should you wish to try cuttings, I would suggest you obtain some rooting hormone from your garden supply store to stimulate root growth.

Many of the larger nurseries have hazelnut plants which they sell as ornamentals and as a source of wildlife food. You may wish to write to Nut Tree Nursery at Downington, Pa. for their catalog.—E. H. Huber, Supervising Forester

"Lost" fawns

Dear Sir: Recently a group of Explorer Scouts and myself were camping in the vicinity of Southfields, New York. After a brief hike through the woods, one of the Scouts returned to the campsite carrying a fawn in his arms. He had found it in a wooded area that had no sign of a deer bed.

Upon investigation of the animal, it was noticed the umbilical cord was still attached and the fawn appeared very clumsy on its newly-acquired legs. Apparently the animal was less than a week old.

I informed the group that the handling of an animal so young by a human being might cause the mother to abandon it because of the "human scent" factor.

Before returning the fawn to the place where it was found, we wiped its body down with milk in an attempt to "cover up" any scent that might have been picked up.

Having been concerned over our handling of the situation since the affair happened, I have been wondering if we did the right thing. If we didn't, what should we have done?

Leonard L. Bonagura,
Explorer Post 373, Brooklyn

• *You were correct in advising your Scouts to return this fawn to the spot where it was found. We have found that all fawns returned to the original point of capture within a period of 24 hours have been accepted by the mother. Also, it has been our experience that none of the fawns returned on a third day after a capture were accepted. We have found these animals a second time by revisiting the liberation site. On these occasions, the fawn was hungry, walking around and in most instances making a bleating noise which attracted us to it.*

I do not know how strong an influence the single "human scent" factor is in a deer mother adopting her fawn. As I recall our experiences, no attempt in any way was made to remove the human scent from the fawns we liberated.

The way in which you advised handling the situation was correct. Rarely will a doe mother abandon a spotted fawn. We hope, incidentally, that you advised the Scouts that if they found fawns in the future, to leave them unmolested. Very rarely are they abandoned; the doe is usually nearby only awaiting the departure of the humans to rejoin her fawn.—C. W. Severinghaus, Leader, Big Game Management Project

Snake repellent

Gentlemen: Do you know of any repellent for rattlesnakes which can be either broadcast or sprayed? The land is uncultivated, just partially overgrown with weeds.

Jacques A. Kurtz, Brooklyn

• *As far as we know there is no good snake repellent which wouldn't have somewhat similar effect on humans. The best suggestion I can make is based on the fact that many cold-bloods cannot stand the smell of moth flakes or similar chemicals. Paradichlorobenzedrine, known more simply as PDB, is a chemical in moth repellent, and obtainable in many drug stores in flake form. Unfortunately, I know many human beings who are allergic to the fumes given off by these chemicals. They may, however, be spread in basements and attics where snakes might be found, and will keep snakes out. In an open field they volatize more quickly and would have to be renewed as the snakes are noted returning to the area.*

In addition to using such chemicals we should like to advise you to get rid of all brush and stone piles in the vicinity of your home, and to seal with concrete any openings about your house or cabin, no matter how tiny. These precautions should keep the snake population down and prevent them from entering the living quarters. The range of the rattler in New York State is somewhat restricted today and in many parts of the State you should not have to take these precautions unless you happen to dislike all snakes. I rather imagine the whole State of New York would smell of camphor if everyone, who disliked snakes, started spreading the stuff around.—E. M. Reilly, Jr., Curator, Zoology, N.Y.S. Science Service

Tree spotter

Gentlemen: Several years ago you gave the address of a company in Pennsylvania (I think it was) which sells a portable paint sprayer for marking trees. I think you said the State used it in marking trees to be cut for lumber; it sent a small stream of paint out which could mark a tree higher up. I would like to get such an article for use in marking temporary woods lines. Can you give me their address?

Katherine S. Harrington, Gilboa

• *We have no knowledge of any firm in Pennsylvania which manufactures a paint sprayer for tree marking. Our foresters use the following: (1) The Nel-Spot tree marking gun which is used with disposable quart cans. Cost—gun, $15; paint about $1 per quart with appropriate volume discounts. Manufactured by the Nelson Company, Iron Mountain, Michigan. (2) The Eagle Tree Marking Gun with quart-sized container which is refilled. Cost about $4. Manufactured by the Eagle Company, Wellsburg, West Virginia. (3) The Panama Pressure Tree Marking Gun holds up to one gallon of paint under air pressure, trigger operated, back mounted. Cost about $30. Manufactured by the Panama Pump Company, Hattiesburg, Mississippi.*

Each of these guns will readily put a paint mark on a tree ten feet away, that is if you're a good marksman. I'm sure you will find any one of these entirely satisfactory for the marking of temporary lines. The advantage of one over the other is dependent on the extent of the marking, the distance the worker would be away from a road and the source of paint.—E. H. Huber, Supervising Forester

"Grinding stone"

Dear Sir: Am enclosing a strange particle taken from a trout caught on a fly. It was the only contents of the stomach. Several fishermen have looked at it but all are baffled. Can you find the answer?

Mrs. R. Smith, Star Lake

• *The white calcareous object you sent us is a "grinding stone" from a large crayfish. —John R. Grelley, Chief Aquatic Biologist.*

Green trees

Sir: Early this summer, workmen appeared on the property adjacent to ours and proceeded to cut down twelve large maple trees. It was their job to clear the land to make way for the construction of a new supermarket. Our 12-year-old daughter, observing this operation, was concerned enough to write about it for her sixth grade class here in Suffern. Below is how she felt.

Dorothy Hines Quintano, Suffern

Progress

The trees on our lane were green; the bark a dark brown. The long slim branches kept the houses nearby cool. The leaves rustled and the sap ran freely. Such a beautiful sight to see.

The trees have been here so long and know everything. Perhaps they saw the Indians sharpening their arrows, or the first house built. A tree lives and dies like us. It eats. It sings and sees. Yet some think it just a hard, brown thing in the way of things—of Progress.

So Progress came and destroyed beauty. Took a life away. A cry of pain that no one heard; a swing, a thump, and there it lay. Some think it is now out of the way. But to us it is a life now gone.

There's our lane no longer beautiful, and Progress moves on to build.

Ann Therese Quintano

Bear trap

Dear Sirs: Several years ago I bought a very large, well made bear trap from a farmer over in Hague, N. Y.

If possible I would like to learn the maker's name.

The only marking is on top of one spring in good uniform letters: "Kenwood, N. Y."

On the underside of trap, probably done by the trap's owner, were the initials J.H.L. apparently indented with a prick punch, the "J" lettered backwards.

I have seen several old bear traps but this one is the best workmanship of any of them.

I would appreciate any information you might be able to ascertain for me.

Thos. H. Clarke, Crown Point

• *Undoubtedly the bear trap you have was made by the Oneida Community, an experiment in communal living, at Kenwood, N. Y.*

Sewell Newhouse was the inventor of the trap and mass production of his traps began in 1855. In 1880 the Community was forced by public pressure to break up and reorganize minus the controversial communal aspects under the name of Oneida Community, Ltd.

Many of the newer traps just bear the name of Oneida but all of the bear traps bore the name of Newhouse. After World War I, Oneida sold their trap business and now concentrates on making fine silverware at Sherrill, N. Y. near the site of the old trap factory. Today, it is known only as Oneida, Ltd., makers of fine silver.

A brief history of the trap business appeared in THE CONSERVATIONIST *for August-September, 1951 and October-November, 1951.—Nick Drahos, Sr. Cons. Educator*

Eurasian Watermilfoil

Dear Sir: With respect to your article on Eurasian watermilfoil that appeared in THE CONSERVATIONIST for June-July, 1960, I would like to point out a typographical error. Eurasian watermilfoil is described by Fernald as having from 14-21 pairs of leaflets instead of the 17-21 in your account. We do not place as much emphasis on this characteristic as we do on the upward curving shape of the leaf divisions. In the closely related native species, *Myriophyllum exalbescens*, these leaf segments tend to point straight out rather than curving toward the tip of the leaf. We would like to note also that not all leaves have to have 14 or more pairs of segments; if only some have this number it is sufficient. Actually, some plants may have no more than 10 or 11 segments per leaf. This is particularly apt to be true of material collected during other than the active growing season as was the case with the specimen in the closeup photograph which I furnished. These are technical points which probably will concern only the systematic botanist but I point them out for your information in the event that you receive questions in this regard.

Paul F. Springer,
Chief, Section of Wetland Wildlife,
Ecology and Management
U. S. Department of the Interior

Fatal accident

Gentlemen: Attached please find a snapshot of a robin that hung itself in an evergreen tree near our home.

The bird was evidently in the process of building a nest with the ordinary household string when it became caught around its neck and at the same time entangled in the branches.

My hand and an open cigarette lighter are in the picture for size comparison.

Robert K. Mead, North Rose

• *This one is unusual, but in the wild, life and death teeter on a fine balance.—Editor*

High peak deer

Dear Sir: My brother and I have been hunting together for the past nine years. Each year we hunt the Adirondack area for a whole week. We covered the Raquette Lake, Uncas trail and Browns pond areas each year. So far we have two bucks to our credit, an 8-point and a 4-point. No deer for the last three years.

We are willing to pack in, maybe fly in, if we can afford it, next year. Where is McIntyre Mountain? What topographic sheet is it on?

My brother suggested hunting in Pennsylvania for the past few years. But we would really like to keep our license money here to help our own State.

Ted Gretch, Buffalo

• *If you want to try deer hunting in terrain similar to McIntyre Mountain, you have a wide choice for selection within a ten-mile radius of Lake Placid. The high peak country generally is hunted far less than its deer population warrants. However, there's an obvious reason. Most of it starts "up" and continues in the same direction. Access by 'plane and vehicle is nil on State lands. Actually, there are many "notches," "glens" and hidden valleys at elevations of 2,500 to 3,000 feet which can and do support a few deer during the winter months. Consequently, hunting opportunity prevails throughout the deer season in such upland pockets despite severe late season storms.*

It should be obvious that the high peak country in late fall is not for beginners. The U.S.G.S. quadrangle maps "Lake Placid," "Mt. Marcy" and "Santanoni" will cover the area pretty well. However, many of the trails indicated, except those maintained by the Conservation Department and the Adirondack Mountain Club, are probably in tough shape because of blow-down.

My suggestion toward a successful hunting trip in this country would be to prospect some areas during the summer and early fall to familiarize yourself with specific deer populations and terrain. Literally, in this region, any notch in the "hills" three miles from a drivable road is God's country, and hunters will be mighty scarce.—Greenleaf T. Chase, District Game Manager

Cure-all?

Dear Sir: Some time ago, I wrote you about how antihistamine eliminates the discomforts of poison ivy. I used it again this summer with like results.

A week ago Sunday when Jimmy, my son, and I went to Essex County and climbed Giant (the second time for me), I tried it for punkie bites. You know how they itch for days afterward. Well the first I noticed their bite, I took half an antihistamine tablet and even though I must have been bitten later I did not notice it. After we came back, there was none of the itching and scratching for several days. That was all; no external application nor anything. Jimmy, who declined the antihistamine, scratched for several days, as usual. That proves that the discomfort to visitors of the mountains can be easily eliminated.

It will also work for mosquito and other insect bites. If plain antihistamine is not available, use cold tablets or capsules with antihistamine in them.

Jess Dildine, Geneva

• *Writer Dildine may really have something good here. Anyone else ever try antihistamine as a counteract've agent against poison ivy, mosquitoes, punkies, etc?—Editor*

Beaver lost

Dear Sir: Yesterday afternoon (June 28) between 6:30 and 7 o'clock I was paddling on the Grass River near the mouth of Little River when I saw a beaver act in, what to me, with my little knowledge of beavers, was a very strange way.

I have been trying to be friendly with these beavers ever since they came several years ago (although at the rate they are cutting down trees a foot and a half through, I wonder if there will soon be nothing but stumps), but until yesterday the nearest one ever came to tolerating me was to swim rapidly back and forth with his head out of water, at some distance and on a moonlit night, before sounding the alarm.

Yesterday began as usual. The first I knew of the beaver's presence was the slap and the splash. But then, in broad daylight and with the sun shining, the beaver, which looked young, being only about a foot and a half long including a small tail, came to the surface and swam straight for the bow of the canoe, with its head high out of water. When it was nearly to the boat it sheared off, swam in circles and zigzagged for a short time, dived perfunctorily once or twice with only a faint slap or none at all and then swam straight for the side of the boat. This time I thought surely it would bump into the boat and I do think its nose might have touched. Then it turned where it was and swam parallel to the boat for a short time with its flank touching the boat (or practically touching). All this time I was assuring it of my harmlessness and good intentions, but it didn't seem reassured and seemed to look at me with a distraught expression.

Then it swam away from the boat and began new circles and zigzags with its head high out of water as before, and this time it uttered many times a plaintive sounding cry, something between "Mm" and "Ng" like a muffled child's voice with just a hint of bulb bicycle horn.

Did it have hydrophobia? Was it a mother trying to distract me from her kittens? What?

When I last saw it it was headed down the river, still crying.

Richard S. Gaines, Canton

• *Your experience of June 28th was probably with a young beaver that had become separated from its mother and the rest of the litter.*

If the beaver was about eighteen inches long, including the tail, it was a big one for a young of the year. They are born anywhere from about May 1st on, but possibly this one was from a real early litter.

Your experience was not uncommon: most young animals will act about in the same manner when separated from their parent and litter mates.—Edward R. Maunton, State Trapper

Burying beetle

Dear Sir: The article, "Some Beetles of New York," of the February-March issue interested me very much, especially as far as the burying bettle is concerned. In the article you stated that burying bettles feed on carrion. Isn't that only a popular belief? I learned that the burying beetles lay their eggs in the dead animals so that the grubs might find some food when they hatch.

I became quite interested last year when I found several burying bettles trying to bury a dead mouse here in the Adirondacks, but I did not see them eat any part of that mouse.

Franz L. Pogge, Paul Smith's

• *Your inquiry as to whether or not the sexton beetles feed on the carrion caused me to take a second look at the published literature. Apparently all the other members of the family Silphidae are predacious, feeding either as adults or larvae on other insects which live primarily on the carrion.*

However, there are several recent studies of the sexton beetle Nicrophorus *which indicate that this insect feeds directly on the carcass of the small bird or animal which it has buried. I will quote Hatch, "Beetles of the Pacific Northwest," 1957, University of Washington Press:*

"The Nicrophorus, *or burying beetles, have the habit in the adult stage of burying small carcasses, in the close vicinity of which they oviposit. During their first hours of life the larvae are fed by regurgitation by the adult, but they soon take to eating the carrion directly and mature in the amazingly short period of 7 days. The basic account is in German by Pukowski, Zeits. Morph. Okol. Tierre. 1933. 27:518-586."—John A. Wilcox, Curator, Entomology, N.Y.S. Science Service*

Canned woodchuck

Dear Editor: A couple of weeks ago our neighbor's beagle raised Cain out in a field behind our house until we finally investigated. This picture shows what we found.

The woodchuck was trying to fight the dog, lunging in its direction as it barked. It also attempted to defend itself against expected attack when we tapped on the can. He growled almost constantly.

When my husband — with great care — pulled the tin can off, Mr. 'Chuck made no attempt to give thanks. Instead, he reared back ready to take on all comers. Hubby had taken his rifle with him because the rodents have been at our berries, but when the little cuss refused to run, man with his gun and dog with his bark, both respected his bravery and left him in peace.

What was in the can which the woodchuck found irresistible? Pork and beans!

Mrs. David L. Bell, Watkins Glen

Sparrow hawks

Dear Sirs: We live adjacent to a large field which develops a tremendous grasshopper population every summer, and we often observe sparrow hawks catching them. So when we read LeRoy Stegeman's interesting article on these birds last fall, our 12-year-old boy built a nesting box to the exact specifications given and we hung it about 30 feet up on an elm tree facing the field. Sure enough, in late March several sparrow hawks appeared, entertained us with some fancy courting and a pair seemed to have moved in for about two weeks. They then left rather abruptly and were replaced by a pair of starlings, much to our disappointment. Did the starlings drive out the hawks or did we? The elm tree is about 200 feet from our house and there are no other houses in sight, but it is on the edge of our garden and fruit trees and the hawks objected quite vociferously whenever we came near, especially one day when we cut down an apple tree. Can we keep the starlings out next year without discouraging the hawks?

Mary Mardels, Natick, Mass.

• *You have my sympathy about the starlings displacing the nesting sparrow hawks. Apparently, there is not too much which can be done, at least that I know of, since the same thing has happened to me.*

I went to the trouble of shooting several pairs of starlings, only to have them replaced as fast as I could shoot them. The hawks arrived and the temporarily sealed opening was reopened for them and they showed definite interest, but their nesting time, unfortunately, coincided too closely with that of the starlings'.

Starlings will tolerate the noise and confusion about human habitations much more readily than will sparrow hawks. The starlings don't seem to need tranquilizers.

The hawks, being much more nervous, as a rule, might do better with a house set further back from the field. They probably chose the barn because the other holes in the area which they could use were preempted and this was a last choice.

My sparrow hawks simply moved out of sight so in a way you are luckier than I am.—Edgar M. Reilly, Jr., Curator, Zoology, State Museum and Science Service.

Swamp or marsh?

Dear Sir: The men here at the base have had quite a few heated discussions about the difference between a swamp and a marsh. We have looked in the dictionary but are not satisfied and would like a professional opinion. We will appreciate your help.

Ken Carter, St. George, S. I.

• *We recognize the difference solely by the type of cover in the area. A wet area which contains standing trees, shrubs and plants of a generally woody nature is a swamp. A marsh is an area in which the annually emergent aquatic plants such as cattail, bulrush, burr reed, etc. dominate the scene. The marsh is for all practical purposes an open area in that few or no standing trees or woody plants exist. If for example, a dam were constructed which would flood a woodland, this area would be considered a swamp. As the trees died out and the so-called emergent aquatic plants began to appear, so would begin the transition from swamp to marsh.—Lee W. DeGraff, Conservation Biologist*

Sheepshead

Gentlemen: Would appreciate it very much if you would let me know the name of pictured fish caught in Lake Ontario, Grimshaw Bay, Wolfe Island, Ontario on July 26, 1960. Have been fishing the St. Lawrence River and Lake Ontario from Goose Bay to Kingston for the past forty years but never caught a fish of this type. It weighed 3¼ lbs, was white on bottom, sides were a bluish-green color deepening towards top of fish and had a golden hue. Was a very pretty fish. After catching, snapped a photo and released fish. We usually release all fish caught, outside of one or two days, when we have a perch or bass dinner. The scales were about the size of a dime.

Walter G. Clickner, Brooklyn

• *This fish is a fresh-water drum, also known as sheepshead* (Aplodinotus grunniens). *While not too common in Lake Ontario, this species is sometimes abundant in Lake Erie, also quite frequently taken in Lake Champlain. It is of interest that the fresh-water drum is the only fresh-water member in a large family of over 34 species well represented in Atlantic and Pacific waters and including many well known game and food fish such as weakfish, croakers and red drum (channel bass).—John R. Greeley, Chief Aquatic Biologist*

Credits

First cover, R. Koch; second cover, Robert C. Kray; pages 2, 24, 25, 29, 34, H. Wayne Trimm; 3, Long Island State Park Commission, Skyways, Nick Drahos; 4, Fred Chambers; 5, George Philip Sauter, Glens Falls; 6, Clayt Seagears, Roy Irving; 9, 10, 11, Ward's Natural Sciences Establishment; 12, 13, Drahos; 16, 17, Earl F. Patric; 18, Watertown Daily News, W. J. Hamilton, Jr.; 19, Hamilton, Trimm; 20, 21, 22, Dr. F. U. Klaehn; 27, Morgan P. Smith; 31, 38, Harlan B. Brumsted; 32, Earl McGuirk; 33, Irving; 35, Dwinal Kerst; 36, Richard E. Hyde; 37, W. Hilts, Warren McKeon; 39, David Allen; 40, Drahos, Fred W. Oettinger; 41, Brumsted, Fish and Wildlife Service; third cover, Clayt Seagears; fourth cover, Steve Pradon.

Delaware survey

Dear Sirs: After hearing, reading and discussing your recent poisoning of fish in the Roscoe area, I think both the fishermen as well as the property owners in this and other areas affected should be given some satisfactory explanation for this procedure.

As secretary of a sportsmen's club, I am writing to find some reason for this type of survey.

Our club has its own lodge and property in Franklin, New York. Most of our members fish the Beaverkill and Steward's Brook on our way to and from our lodge every week end. There are at least 4 or 5 other clubs in Bergen County, N. J. who also own their own lodge and acreage in this New York State area.

I think that most clubs, as well as the one with which I am connected, have done a great deal toward conservation in New York State. We feel that as taxpayers, licensed fishermen and as true sportsmen we are entitled to have some kind of an intelligent explanation for the destruction of these fish.*

Richard A. Fallon, Secretary,
Oritam Rod & Gun Club

(*The writer refers to the use of a toxicant, rotenone, by fisheries biologists in the Delaware River watershed this summer to sample and study the quantity, quality and association of fish present in these waters.—Editor)

• *Population sampling in fisheries work is a long established technique to secure information on the abundance, dynamics and inter-relationships of fish populations. It is just as essential that the fish manager have this information as it is for farmers to know the condition of their growing crops.*

Fish sampling techniques include observation, use of various types of nets and weirs, electrical shocking and toxicants, named in ascending order of accuracy and efficiency. Use of any of these techniques (except observation) involves killing part or all of the fish sampled, either necessarily as when gill nets or toxicants are used, or deliberately for the value to be gained by examining the specimens. Rotenone sampling is an established technique being used extensively in several states, although it has been used more in lakes than in streams.

Rotenone sampling in Stewart Brook was planned as part of a project to test this technique in a few relatively small streams in comparison with the electrical shocking method. Report of the investigation has not yet been prepared but the rotenone technique has two clear advantages. (1) It is more accurate and (2) it can be taken more quickly and with a smaller crew than is possible with other methods. With limited funds and personnel for fish management work, this is an important consideration.

In our opinion, if such sampling is carefully designed and carried out as it should be, the disadvantage due to killing the fish sampled is temporary and normally insignificant relative to long range fishing success. In the first place, specimens thus made available contribute to the accuracy of results because information on weights, measures, condition, pathology, age and growth and food habits is more or less dependent upon having the specimen in hand. Further, the sample section is always very small with relation to total area of stream or lake. For Stewart Brook, the sample area is estimated to have been less than 2 per cent of the 4.2 miles being stocked. If few fish are present in the stream, few will be killed in the sample section. If fish are abundant, they will quickly repopulate the section from above and below.

Finally, in Stewart Brook and several others of the streams included in these tests, the information from rotenone sampling indicates that fingerling trout stocking is unnecessary and wasteful. In Stewart Brook alone, this will save an annual stocking of 3,000 brown trout fingerlings. This information could not have been made available from present methods of electrical shocker sampling.—C. W. Greene, Chief, Bureau of Fish

Number 9485

Dear Editor: Raquette Lake again provides a tag return from a lake trout of unusual interest. Harry Kempf of Utica caught a lake trout on May 5, 1960 with tag number 9485. This fish had been handled by Department personnel at least three times in its life history before meeting with the fatal accident of taking Mr. Kempf's lure.

No. 9485 was first trap netted and tagged in October, 1952 during spawntaking operations in Raquette Lake. At this time he was 20¼ inches long, weighed 3 pounds and was aged as 11 winters old. He was trapped again in the nets in October, 1956 and 1957, both times weighing approximately 4 pounds. At time of capture by Mr. Kempf he was 23 inches long, 4¾ pounds and 19 winters old or in its 20th growing season. The slow growth rate is not unusual for trout in Raquette Lake.

One can only speculate upon the number of lures, baits or what have you that this laker has looked at or looked over.

R. G. Zilliox,
Dist. Fisheries Mgr.
Adirondacks District

Night work

Dear Sir: The other night my Grandfather and I were down by Ellicot Creek tending a fire. We were trying to burn up logs from a willow tree that we had cut down that day. At around 10:30 p.m. we heard a woodpecker. This was very strange as we had never heard of a woodpecker working at night before.

Our theory of this is that the woodpeckers had a nest in this tree. She was just about ready to lay her eggs and they were working franticly to rebuild a new nest.

We are not sure that this theory is true and would like to know of any reasons that you might have for this oddity.

Robert L. Ware, Williamsville

• *You are undoubtedly correct in your theory that the bird was working overtime because of the pressure of the imminent arrival of young in the form of eggs. Birds will occasionally do queer things, for which there is no obvious human reason. Perhaps this is why we have the expression that it's "For the birds."—Edgar M. Reilly, Jr., Curator, Zoology, State Museum and Science Service*

Flight

Nature developed all kinds of coverings for her kids.

She did a skimpy job on the frog—no hair. But she made up for it with a peachy job of well-fitted skin which is more than I can say about mine.

Snakes got scales which obviously cover the ground. Fish, like bass, got scales which sometimes cover the kitchen. For turtles, Nature did it the hard way.

She went all out for the Yak and the Old English Sheep Dog but she ran out when she got to the hippo (I don't blame her) and the Chihuahua.

When she outfitted our sharpest character, she designed the quill and a lot of folks got stuck with it. In the fur coat department, she dealt one off the bottom of the deck to the mink and father got stuck with it. It was shear bad luck that the beaver got treated the same way.

All that seemed to take care of those that crawled, walked and swam. As far as flying was concerned, Nature batted the idea around for a long time before the feather was developed and things *really* got off the ground. Before then, the mechanics of air dynamics were little understood. There were a lot of bugs in flight. But the new birds soon took a lot out.

For the benefit of those who love to fool around with useless statistics, there currently (late Autumn) are about 30 trillion feathers sticking from the skins of birds resident to the United States. This nonsensical computation is based on the estimated U. S. population of 6,000,000,000 birds each of which wears from about 3,000 to 25,000 feathers.

It also is unnecessary to know that nearly all those 30 trillion feathers can individually be raised, lowered or waggled by the thousands of specialized muscles which thread every bird's skin.

The feather itself is so complex that it may have more than a million parts. From the tough pliant shaft grow fibers locked together by smaller fibers which in turn have interlocking parts like microscopic zippers.

Swarming with living cells, the growing feather pushes from the skin—like the budding antler of a deer. Cut the sprouting feather—or antler—and it bleeds. Finally, blood circulation stops. Functional maturity of the cell structure has been reached.

The deer scrapes the "velvet" from its dead antler. The bird normally adds something to its dead feather—oil. This it gets from a handy oil can at the base of its tail feathers. Birds have been known to run other material through the feathers—from live ants to fragments of camphor. Nobody really knows why. Maybe it's for the same reason that humans rub in their hair everything from Mesopotamian mud to Persian love Pomade.

Feathers may be brighter than the birds themselves although the term "bird-brained" is misleading. Actually, bird brains are extremely heavy in proportion to total body weight. Tests in bird behavior seem to put the raven and the crow out front in brain development and in about the same slot of intelligence as the horse and cat. The parrot is close behind.

Despite the obvious fact that bird colors rival the kaleidoscope, there is no known bird that actually is blue, even in part. What appears to be blue pigment is merely the curious way in which the cell structure of certain feathers reflects light. For example, when light is reflected on a misty sky, a rainbow may appear where everyone knows that the actual colors don't exist.

Too bad to show up the bluebird as an optical fake but no punches should be pulled in a high class scientific piece like this.

The main function of the feather is, of course, to get the bird in the air. But it needs plenty of help. An extra-light skeleton and a bunch of well placed air sacs aid buoyancy. Enormous breast muscles flap the wings and use up so much energy that rapid breathing, a super-fast heartbeat and more red corpuscles per ounce than any other critter are necessary to keep up the pace.

Humming birds with a wingbeat of 50 or more per second have breast muscles four times larger than those of the pigeon which flaps its wings only a tenth as fast. Incidentally, the more time the bird spends flapping its wings, the greater the number of blood vessels are required to feed the muscles. Hence the darker the breast meat becomes. That's why the virtually flightless chicken has so much white. The ruffed grouse (opposite) is a winged bombshell yet it has plenty of white meat, too. But it doesn't migrate and it's flight is almost necessarily short.

The bird's wing naturally is the perfect tool for flying.

Bend your arm at the elbow and point your first two fingers like Willy's cocked cap pistol. Your hand now represents that part of the bird's wing to which the stiff flying feathers—the primaries—are attached. The bird's first two "finger" bones have shrunk substantially and the other two are undeveloped.

The cocked thumb holds about four short, stiff feathers (see picture opposite) which help control the position of the wing's leading edge. Doubtless you couldn't care less to know that this thing is called the alula. Some day, though, it might come in handy as a finger of speech.

The bird's secondary flying feathers are attached to what is represented by your forearm. The upper arm merely holds the shoulder feathers and the wing membrane.

Arms and hands are held out straight for the flapping down beat which pushes the air behind like the pull of an oar on water. The overlapping feathers are tight for greatest wind resistance. For the up beat, arms are bent at the wrist and elbows and the feathers are separated to minimize air resistance—as an oar is "feathered" on the return stroke. Thus birds literally row through the air.

Some birds use their wings to row through the water too. Many of the sea ducks thus are able to dive quickly to depths of 100 feet or more. And while we're at the bottom of this thing, we should mention that these sea ducks normally feed down there on hard-shelled molluscs.

The ducks swallow these rocky creatures whole. Immediately a really frightening operation begins. This, of course, has nothing to do with flight but we thought you'd like to know. Well then, imagine the consequences if ever you succeeded in swallowing a whole unopened cherrystone clam—or oyster. To the duck—it's no problem. The bivalve merely goes into the bird's gizzard where it actually is crushed to pieces with a noise so loud that it can be heard across the room. The duck's digestive fluid then quickly absorbs the shell fragments and that's that.

It also might be productive to know that the Great Auk went into extinction a century ago via the rise to popularity of the American feather bed. These big, rather stupid, flightless birds, clothed from head to foot in Grade A feather-bed type down, could easily be herded up a gang plank and into a boat. Greed never had pickings so soft:

The first recorded use of bird flight by man may have come from the writing quill of Pliny when he reported how Roman race track bettors spread the news of winning chariots. They simply carried barn swallows to the races, dyed the birds with the color of the winning Ben Hur and let them fly back home.

This whole thing is for the birds, too.

—Clayt Seagears

GLIMPSE OF GLORY

(Ruffed Grouse at Take-off)

Autumn Pond—Long Island